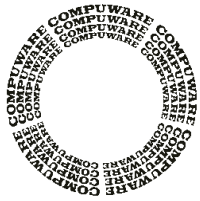
File-AID/MVS

SMF Record Mapping Reference JES V4

Release 8.8



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Doc. CWFARS8H
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Contents

Introduction

This manual provides instructions and examples for installing and using Compuware's File-AID Release 8.8 SMF Record Mapping facility.

This document applies specifically to File-AID/MVS Release 8.8 MVS and is designed to be used to map IBM JES Version 4 or 5 SMF records.

The first chapter provides an overview the File-AID SMF Mapping facility. The second chapter provides the installation instructions. The remaining chapters provide user information regarding this facility. The following list briefly describes the contents of each chapter:

- **Chapter 1, "Overview":** SMF facility feature and function descriptions.
- **Chapter 2, "Installation Instructions":** Brief installation instructions.
- **Chapter 3, "Using the SMF Record Mapping Facility":** Basic information and instructions for using the SMF mapping facility.
- **Chapter 4, "Examples":** Several examples illustrating basic to more complex usage of the SMF mapping facility.
- **Chapter 5, "SMF Record Mapping Conventions":** Conventions for member naming, using USE and NEXT commands for multiple 01-level maps, generic layouts, and displaying the value of the record type field.
- **Chapter 6, "SMF Record Mapping Information Tables and Usage Notes":** Record type information tables and descriptions.
- **Chapter 7, "Validating and Maintaining Your SMF Mapping Libraries":** SMF record layout validation, source layout update, XREF maintenance, and user layout coding.

System Requirements

A complete File-AID system, (Batch, SPF, and XE) is required to use the files on the SMF record mapping tape.

Chapter 1. Overview

The SMF Record Mapping facility is shipped with the File-AID product tape as members of the INSTALL dataset. It consists of PL/I record layouts for most of the common IBM SMF record types. Also included is a File-AID XREF library, containing XREF and selection criteria members that automate the process of layout selection when browsing SMF data records. A complete File-AID/MVS system, (Batch, SPF, and XE) is required to use the files on the SMF record mapping tape.

File-AID users may employ the SMF Record Mapping facility to browse raw SMF data intelligently using the Compuware-supplied PL/I source layouts, automatic layout cross reference (XREF) members, and File-AID's selection logic.

The SMF Record Mapping facility provides the following features:

- Layouts updated to match the latest documentation from IBM for MVS JES Version 4.

Note: Most SMF record changes for JES V4 are downward compatible to SMF records generated by earlier versions of JES. In some cases, new fields have been added to the end of some SMF records and will not be shown when mapping SMF records from earlier versions.

- Simple installation and use. Only two datasets are installed: PL/I source library and an XREF library. Online and offline record formats are distinguished by the naming convention: (SxFxxxxx = offline, SxNxxxxx = online).
- Comprehensive XREF members (SLFALL for offline SMF data, SLNALL for online SMF records) enable automatic layout selection and mapping of ALL record types.
- Selection criteria members (SCFxxx and SCNxxx) automate record selection and can be used as examples.
- Layouts are shipped in PL/I source and precompiled, binary maps. PL/I source is shipped precompiled and stored in binary form.
- Layouts have descriptive field names instead of just eight-character names.
- Support for nearly all standard SMF record types.
- Layouts for File-AID SMF audit records are included.
- This reference document containing instructions and examples.

Chapter 2.
Installation Instructions

The SMF Mapping facility is shipped as three members of the File-AID Release 8.8 install PDS:

- SMF4INST: JCL and instructions for creating two PDS libraries
- SMF4PLI: Compressed unloaded image of PL/I library
- SMF4XREF: Compressed unloaded image of XREF library.

To install the SMF Mapping facility, simply tailor and run the JCL provided in the install PDS member SMF4INST to create the following two DASD PDS libraries:

```
????????.FA.V8R8M0.SMF4.PLI  - PL/I source layouts of SMF records
????????.FA.V8R8M0.SMF4.XREF - XREF, selection, and compiled layouts
```

The installation is complete after the DASD libraries are created.

Chapter 3.
Using the SMF Record Mapping Facility

You can view SMF records online while they are still residing in the SYS1.MANx datasets, or offline after they are unloaded to a historical dataset. Use the File-AID Browse function (option 1) to interactively view SMF data records. Each record is shown formatted field by field with the data contents of each field normalized and presented according to the supplied PL/I layouts.

The only difference between online SMF records and unloaded offline SMF records is that 4 bytes in two 2-byte fields at the beginning of each record (SMFxxLEN - 2-byte binary record length, and SMFxxSEG - 2-byte binary segment descriptor) are present in the online records but not in the offline records. This means that the locations of online SMF fields versus offline SMF fields are different by 4 bytes. File-AID provides for these 4 bytes in the online SMF layouts, XREFs, and selection criteria (SxNxxxxx members) and not in the offline SMF layouts, XREFs and selection criteria (SxFxxxxx members). See "Member Naming Convention" on page 5-1 for more information on online versus offline SMF records.

Each SMF record has its own record type. SMF record types are usually referenced by their decimal record type value, but are selected and processed by File-AID using the hex record type value. For example, record type 30 (decimal) is hex value X'1E'. The record type value (SMFxxRTY field) is a one-byte binary value located at offset 5 (relative to 0) online or offset 1 offline. (Online offset 5 corresponds to File-AID actual location 6 when using File-AID's Position field for selection criteria. Offline offset 1 is File-AID Position 2.)

This document provides record type information tables to assist you in using the mapping facility. Each table shows the SMF Record type decimal values, hex value, descriptions, notes flag, source layout member name, and any special XREF or selection criteria to use for viewing the record. The tables are:

- Table 6-1 on page 6-2 — MVS Offline SMF Records Mapping.
- Table 6-2 on page 6-4 — MVS Online SMF Records Mapping.

The SMF Record Mapping facility automates the source layout presentation for each record type. However, some records are very complex and require interaction to finish formatting all data bytes. These manual interaction record types are noted in the tables and are fully documented in a later section of this reference. The USE, NEXT, and USE NEXT primary commands give you the ability to completely map most SMF records.

Note: Data to be viewed interactively must reside on DASD since File-AID does not support online tape processing. However, you can use File-AID/Batch to print selected SMF records from tape. (See "Example 5 - File-AID/Batch FPRINT Execution" on page 4-5.)

Use the IBM publication *System Management Facilities (SMF)* to fully interpret and decode all SMF record fields.

Mapping Procedure

The following procedure describes how to use the SMF record mapping facility:

1. Access File-AID.
2. Select option "1" - (Browse).

3. Set the “Browse mode” to “F” (Formatted).
4. Enter the name of the dataset containing the SMF data to be viewed in the “Specify Browse Information” area.

   Note: If you are selecting an online (SYS1.MANx) dataset, be sure the dataset you specify is currently active or contains SMF records.

5. Set the “Record layout usage” to “X” (Xref).
6. Enter the name of the installed ????????.FA.V8R8M0.SMF4.XREF library in the following fields:
   - Record layout dataset
   - XREF dataset
   - Selection criteria DSN
7. In the “Xref member” field, enter the member name for the XREF member (“SLFALL” for offline SMF data mapping, “SLNALL” for online SMF data mapping, or leave member name blank for a list of members).

   Note: When using the XREF members SLFALL or SLNALL, Compuware recommends a TSO region size of at least 4096KB (4MB).

8. Set the Selection criteria usage field to “N” to select all records. If you wish to select a subset of records, set the “Selection criteria usage” field to “Q” and see the examples shown in Figure 4-2 on page 4-2 - selecting record types, and Figure 4-3 on page 4-3 - selecting step termination (type 04) records for a specific JOB name)
9. Press <Enter>. (Figure 4-1 on page 4-1 shows the Browse panel entries)

   File-AID then presents a formatted display of the first record. See an example formatted display in Figure 4-4 on page 4-4.
10. Use the RIGHT or FWD (PF11) and LEFT or BACK (PF10) commands or PF keys to move from record to record.
11. Use DOWN (PF8) and UP (PF7) commands or PF keys to view additional layout fields not on the screen.

    Note: You can use the FPRINT primary command to request a formatted printout of one or more of the SMF records currently selected. In addition, you can also use the File-AID/Batch FPRINT function to generate hardcopy formatted reports of selected SMF records on DASD or TAPE. See Figure 4-6 on page 4-5 for an example File-AID/Batch FPRINT execution.

12. Be sure to read any notes for each record type if additional mapping is needed.

Chapter 4.
Examples

The examples shown in this chapter illustrate some of the features of the File-AID SMF Mapping facility.

Example 1 - Browse Screen Entries

A sample of the Browse screen entries is shown in Figure 4-1.

The Browse dataset is the name of the DASD file containing the SMF records you wish to examine.

All other dataset fields on the Browse screen refer to the XREF library created when the File-AID SMF Mapping facility was installed. The most common XREF member names to use are the special, all encompassing, XREF members:

- Maps all *OFFLINE* record types:
- Maps all *ONLINE* record types - SYS1.MANx: **SLNALL**.

Figure 4-1. Sample Browse Screen for SMF Mapping (Online Data)

```
File-AID --------------  Browse - Dataset Specification  ----------------------
COMMAND ===>

Browse Mode                ===> F          (F=Fmt; C=Char; V=Vfmt; U=Unfmt)

Specify Browse Information:
  Dataset name or HFS path ===> 'SYS1.MAN1'
  Member                   ===>            (Blank or pattern for member list)
  Volume serial            ===>            (If dataset is not cataloged)

Specify Record Layout and XREF Information:
  Record layout usage      ===> X          (S = Single; X = XREF; N = None)
  Record layout dataset    ===> FA.V8R8M0.SMF4.XREF
  Member                   ===>            (Blank or pattern for member list)
  XREF dataset             ===> FA.V8R8M0.SMF4.XREF
  Member                   ===> SLNALL     (Blank or pattern for member list)

Specify Selection Criteria Information:     (E = Existing; T = Temporary;
  Selection criteria usage ===> Q           M = Modify; Q = Quick; N = None)
  Selection criteria DSN   ===> FA.V8R8M0.SMF4.XREF
  Member                   ===>            (Blank or pattern for member list)
```

Example 2 - Using Selection Criteria to Control Processing - Online Data

In this example File-AID “quick” (Selection criteria usage=Q) temporary unformatted selection criteria is specified to control the selection of records for accessing online data. This selection tells File-AID to select records with a decimal record type value of 4, 5, 20, 34, 35, or 40.

Notice that the SYS1.MANx dataset represents online SMF records. IBM documented field offsets need to be translated to File-AID *positions* by using the following formula:

```
Online Position =  (Offset of field in SMF manual plus 1)
```

Using the above formula, the SMFxxRTY (Record type) field is listed in the SMF manual as offset 5, so we would use a *position* of 6 for testing for online record types.

Select records that have a hex value in position 6 (record type) matching any of the following X'04', X'05', X'14', X'22', X'23', or X'28' (Unformatted Selection criteria line 1 entered as Position=6, RO=EQ, Data Value=X'04,05,14,22,23,28' (comma means OR in single quoted string)). Hex values correspond to decimal record type numbers (For example, X'28' = decimal 40).

Figure 4-2. Selecting Multiple Record Types (Online Data - Position 6)

```
File-AID -------------  Unformatted Selection Criteria  ---  ROW 1 TO 16 OF 25
COMMAND ===>                                                 SCROLL ===> CSR

Use END to continue, CANCEL command to return to main screen.

    AND
Cmd /OR Position Length RO                      Data Value
--- --- -------- ------ -- ----------------------------------------------------
___      6____   _____  EQ X'04,05,14,22,23,28'_____________________________
___ AND  _____   _____  EQ ______________________________________________________
___ AND  _____   _____  EQ ______________________________________________________
___ AND  _____   _____  EQ ______________________________________________________
___ AND  _____   _____  EQ ______________________________________________________
___ AND  _____   _____  EQ ______________________________________________________
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___ AND  _____   _____  EQ ______________________________________________________
___ AND  _____   _____  EQ ______________________________________________________
___ AND  _____   _____  EQ ______________________________________________________
___ AND  _____   _____  EQ ______________________________________________________
```

Example 3 - Selecting Specific Records - Offline Data

In this example, File-AID "Quick" unformatted temporary selection criteria is again used to limit the selection of records to a specific record type and data content.

Notice that the SMF data is in a sequential file and represents *offline* SMF records. IBM documented field offsets need to be translated to File-AID *positions* by using the following formula:

```
Offline Location =  (Offset of field in SMF manual minus 3)
```

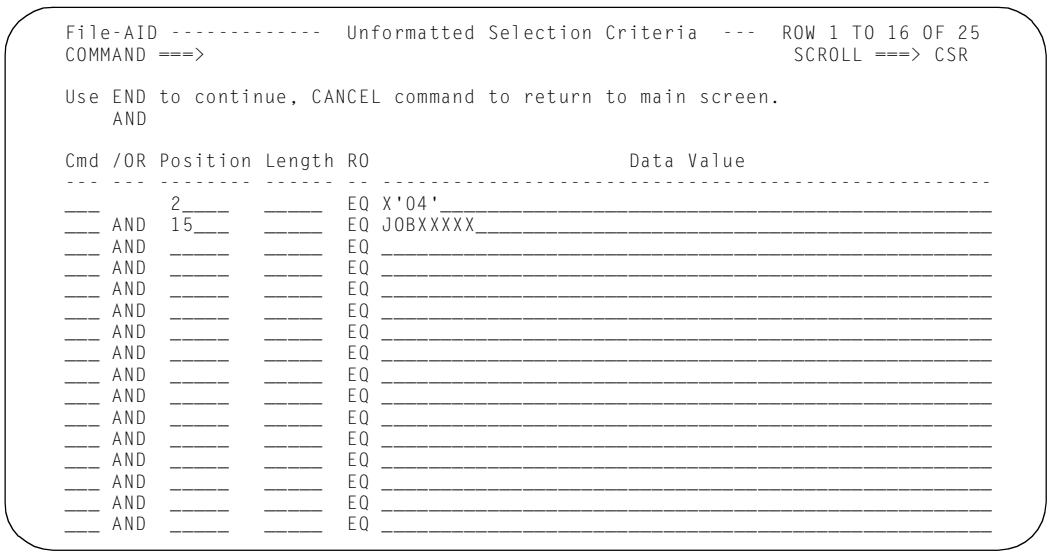
Using the above formula, the SMFxxRTY (Record type) field is listed in the SMF manual as offset 5, so you would use a *position* of 2 for testing for a specific offline record type.

This selection tells File-AID to select Type 04 (Step termination) SMF records for JOB "JOBXXXXX". (The JOB name is placed in the Type 04 record field SMF4JBN at offset 18 (decimal). Using our formula we can tell File-AID to match the JOB name at *position* 15.)

- Make sure data file dataset references offline SMF records on DASD.
- Set "Record layout usage" to "S" (single).
- Specify "Record layout Member" to "SMF004".
- Specify selection criteria usage = "Q" (Quick).

- When the unformatted criteria screen is displayed, select records that have a hex value of X'04' in location 2 (offline record type). (Selection line 1 entered as Position=2, RO=EQ, Data Value=X'04').
- AND only select these Type 04 records for processing if they are from JOB "JOBXXXXX". (Selection line 2 entered as: AND Position=15, RO=EQ, Data Value=JOBXXXXX).

Figure 4-3. Selecting Type 04 (Offline - Step Termination) for JOBXXXXX



Example 4 - Formatted Display

This example shows a Formatted display of a Type 04 (Step Termination) record for JOBXXXXX for offline SMF data. Selection criteria is used as described in "Example 3 - Selecting Specific Records - Offline Data" on page 4-2.

Figure 4-4. Formatted Display of Selected Type 04 Record for JOBXXXXX

```
File-AID/BROWSE - SYSTEM.SMF.DATA.DASDFILE ------------ UNPRINTABLE CHARACTERS
COMMAND ===>                                                 SCROLL ===> CSR
RECORD:     1                    SMF_TYPE_4                      LENGTH:  235
---- FIELD NUMBER/NAME ------ COLUMNS- ----+----1----+----2----+----3----+----4
1 SMF4FLG_SYS_INDICATOR         1:0    00001110
2 SMF4RTY_RECORD_TYPE             2    X'04'
3 SMF4TME_TIME_RCD_MOVED          3    274095
4 SMF4DTE_DATE_RCD_MOVED          7    94220
5 SMF4SID_SYS_IDENT              11    9121
6 SMF4JBN_JOB_NAME               15    JOBXXXXX
7 SMF4RST_TIME_RDR_GOT_JOB       23    271784
8 SMF4RSD_DATE_RDR_GOT_JOB       27    91220
9 SMF4UIF_USER_ID                31
10 SMF4STN_STEP_NUMBER           39    X'01'
11 SMF4SIT_TIME_INITIATOR        40    272246
12 SMF4STID_DATE_INITIATOR       44    91220
13 SMF4NCI_NO_CRD_IMAGES         48    0
14 SMF4SCC_STEP_COMPLETE_CODE    52    X'0000'
15 SMF4PRTY_ADDSPC_DSPTCH_PRI    54    X'09'
16 SMF4PGMN_PROGRAM_NAME         55    IEFBR14
17 SMF4STMN_STEP_NAME            63    IEFPROC
18 SMF4RSV5_RESERVED             71    0
19 SMF4SYST_LRGST_TOP_STG_USD    73    236
20 SMF4HOST_LRGST_BOT_STG_USD    75    340
21 SMF4RV1_RESERVED              77    0
22 SMF4RSHO_REGION_SZ_ESTAB      79    4096
23 SMF4SPK_STG_PROTECT_KEY       83    X'80'
24 SMF4STI_STEP_TERMINATE_IND  84:0    00000000
25 SMF4RV2_RESERVED              85    0
26 SMF4AST_DEV_ALLOC_START       87    272247
27 SMF4PPST_PROB_PROG_START      91    272380
28 SMF4RV3_RESERVED              95    X'00'
29 SMF4SRBT_STEP_CPU_TIME        96    X'000005'
30 SMF4RIN_RCD_INDICATOR       99:0    0000000000000000
31 SMF4RLCT_OFFSET_OF_RELOC     101    133
32 SMF4LENN_DVC_ENTRY_LENGTH    103    26
********* BOTTOM OF LAYOUT - DATA EXCEEDS LAYOUT BY 131 BYTES ********* ********
```

Formatted display profile commands are issued to tailor the presentation of information including:

- ARRAY OFF
- ALIGN OFF
- GROUP OFF
- SHOW NUMBER
- SHOW OFFSET
- OFFSET COLUMN.

To view the decimal value of the RECORD_TYPE field normally shown in hex, type the command:

```
DISPLAY 2 BIN   (Display field number 2 in binary)
```

File-AID displays binary numbers normalized to their decimal value. To see the hex representation of a binary decimal value (or any field) type the command:

```
DISPLAY x HEX   (Display field number "x" in hex)
```

File-AID defines and displays bit encoded fields as a string of 0's and 1's to enable bit decoding. To display any field in "bit" mode, type the command:

```
DISPLAY x BIT   (Display field number "x" in bit mode)
```

Figure 4-5 on page 4-5 shows the List of Available Record Layouts displaying 01-Level layouts present in the compiled source (map) member SMF004. To access this list, issue the USE primary command without specifying an 01-level copybook name.

Figure 4-5. List of Available Layouts - USE Command - SMF004 Member

```
File-AID ---- LIST OF AVAILABLE RECORD LAYOUTS --------------  ROW 1 TO 5 OF 5
COMMAND ===>                                                  SCROLL ===> CSR
            Member
  S    Nbr  name       01-level Name                  Status
 ---   --- --------  -------------------------------  ------------------------
         1 SMF004    SMF_TYPE_4                     CURRENT MAP
 S       2 SMF004    SMF4_NON_SPOOL_DEVICE_ENTRY
         3 SMF004    SMF4_ACCOUNTING_SECTION_CONTD
         4 SMF004    SMF4_ACCOUNTING_SECTION
         5 SMF004    SMF4_RELOCATE_SECTION
****************************** BOTTOM OF DATA ********************************
```

Example 5 - File-AID/Batch FPRINT Execution

This example shows the JCL required to execute File-AID/Batch to selectively print a formatted report of the first 10 offline SMF type 14 (X'0E') or 15 (X'0F') records that contain the string "USER001" somewhere in the record (beyond byte 4).

File-AID/BATCH can process SMF data on tape. Complete documentation of JCL and control cards is provided in the *File-AID/Batch Reference Manual*.

Figure 4-6. File-AID/Bathc FPRINT 10 SMF Records on Tape from USER001

```
//STEP01   EXEC PGM=FILEAID,REGION=4M
//STEPLIB  DD  DSN=????????.FA.V8R8M0.LOAD,DISP=SHR
//*
//SYSUDUMP DD  SYSOUT=*
//SYSPRINT DD  SYSOUT=*
//SYSLIST  DD  SYSOUT=*
//SYSTOTAL DD  SYSOUT=*
//DD01     DD  DSN=SYSTEM.SMF.DATA(0),DISP=SHR
//DD01RL   DD  DSN=????????.FA.V8R8M0.SMF4.XREF,DISP=SHR
//DD01XR   DD  DSN=????????.FA.V8R8M0.SMF4.XREF(SLFALL),DISP=SHR
//SYSIN    DD  *
$$DD01 FPRINT RDW=3,SHOW=OFFSET,              PRINT OFFSETS FOR ANY REC
              IF=(2,EQ,X'0E,0F'),             SELECT ONLY TYPE 14 OR 15
              IF=(5,0,C'USER001'),OUT=10      FIRST 10 FOR USER001
//
```

The following list explains the JCL that is shown in Figure 4-6:

- DD01 DD - Identifies SMF data file
- DD01RL DD - Identifies File-AID SMF XREF dataset containing compiled PL/I record layouts
- DD01XR DD - Identifies File-AID SMF XREF dataset containing XREF member SLFALL (handles all record types)
- SYSIN DD - Control card input follows

- $$DD01 - Directs processing to DD01 input file.
- FPRINT - Identifies function as a formatted print.
- RDW=3 - Parameter to ignore variable length record descriptor word (RDW). Location offsets will start at data byte 1.
- SHOW=OFFSET - Parameter tells File-AID to show the relative offset of each SMF field formatted on the report.
- IF=(2,EQ,X'0E,0F') - Syntax of IF parameter (from location, operator/length, data to search for), is a compare at data byte 2 for record types 14 or 15 (hex '0E' or '0F'). Only type 14 and 15 records are considered for printing.
- IF=(5,0,C'USER001') - Second IF parameter acts like an AND condition and performs a "scan" from location 5 to the end of the record (length=0). Only type 14 or 15 records that contain the string USER001 anywhere in the record will be printed.
- OUT=10 - Parameter stops processing after 10 records are found and printed.

Chapter 5.
SMF Record Mapping Conventions

This chapter describes the SMF record mapping conventions that File-AID uses for member naming, using USE and NEXT commands for multiple 01-level maps, generic layouts, and displaying the value of the record type field.

Member Naming Convention

Naming conventions for the SMF mapping facility members are as follows:

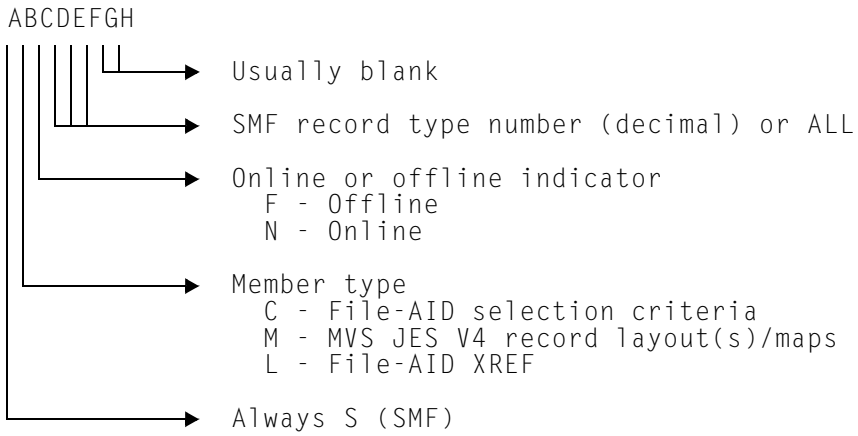


Table 5-1. Example Member Names

SCF014	SMF type 14 (decimal) offline selection criteria
SCN014	SMF type 14 (decimal) online selection criteria
SMF014	SMF type 14 (decimal) offline layout(s)/map
SMN014	SMF type 14 (decimal) online layout(s)/map
SLF014	SMF type 14 (decimal) offline XREF member
SLN014	SMF type 14 (decimal) online XREF member

1. SCxxxxx selection criteria members only exist in XREF library
2. SLxxxxx XREF members only exist in XREF library
3. SMxxxxx PL/I source layouts reside in PLI library
4. SMxxxxx compiled layouts (maps) only exist in XREF library

Multiple 01 Level Maps and the Commands USE and NEXT

Each PL/I source member in the PLI library and its corresponding map member in XREF may contain one or more "01 LEVEL" layouts. Multiple "01 LEVEL" layouts are needed to handle special mapping requirements for a given record type or to describe multiple variations of a record type that may be present in the data. Each "01 LEVEL" represents a distinct "layout" and may be based at any location in a data record by using the primary command "USE".

The USE command is provided so that you can specify a layout and a position in the record to begin mapping.

Syntax of the USE command is:

```
USE  {  offset  }    {  Copybook name  }
     {  NEXT    }    {  *              }
     {  PREV    }
```

The NEXT command is provided to invoke XREF logic to automatically select a layout for the next segment of record data. When no XREF is active, the NEXT command can be used to place a layout at the byte location in the record that immediately follows the last byte mapped by the current layout.

Syntax of the NEXT command is:

```
NEXT {  n  }    {  Copybook name  }
```

To learn more about the USE and NEXT commands, see the *File-AID Online Reference Manual* or File-AID online tutorial.

The NEXT and USE commands are usually used in conjunction with an XREF and multiple layouts when mapping "segmented" records. A segmented record is a record type that has a base section described by one record layout and one or more following segments of data each of which is described by a different layout. SMF record type 22 (Configuration) is an example of a segmented record.

Should you need to change a layout or XREF, the Format utility (hidden option 3.10) of File-AID is provided to compile PL/I (or COBOL) source layouts into maps and to (re)place the maps into the XREF library. Use the XREF utility, option 7, to build and maintain the automatic layout XREFs. See Chapter 7, "Validating and Maintaining Your SMF Mapping Libraries".

SMFGNRIC and SMNGNRIC - Generic SMF Record Layouts

Whenever the master XREF (SLFALL - offline, SLNALL - online) encounters an SMF record for which no map is provided, a generic layout (SMFGNRIC - offline, SMNGNRIC - online) is displayed.

The generic layout shows the basic header fields of the SMF record and also may display some of the data in hex.

Displaying Decimal Value of Record Type

The formatter command DISPLAY n BIN (where “n” is a field number of some layout field) can be used to convert a character or hex field to its decimal value. This command is very helpful in decoding the RECORD_TYPE field (field number 2 offline, field number 4 online) so that the decimal value of the SMF record type is presented instead of the hex or character representation of the record type value.

The RECORD_TYPE field is defined as CHAR (1) and is displayed as one character if the hex value of the record type is a displayable character. However, the hex value of the record type field is usually a non-displayable character, and is therefore shown as two hex digits (X'xx') and is highlighted for emphasis. In any case, use the DISPLAY n BIN command to see the decimal value of the record type field.

Chapter 6.
SMF Record Mapping Information Tables and Usage Notes

This chapter describes the record type information tables that assist you in using the mapping facility. Each table shows the decimal value, hex value, description, source layout member name and any special XREF to use for viewing each SMF record type as follows:

- MVS Offline SMF Records Mapping — Table 6-1 on page 6-2
- MVS Online SMF Records Mapping — Table 6-2 on page 6-4.

The SMF Record Mapping facility automates the presentation of the source layout for each record type. However, some records are very complex and require interaction to complete the formatting of all data bytes. The tables provide a page reference for these manual interaction record types that direct you to the additional description.

Table 6-1 Offline SMF Records Mapping

Table 6-1. Offline SMF Record Mapping. MVS JES V4 SMF Records

RECORD TYPE (Location 2)					
DEC	**(HEX)**	**Description**	**XREF Cross Reference**	**PLI Member**	**For Information See Page:**
ALL		*ALL RECORD TYPES*	SLFALL	*ALL*	
00	(00)	IPL		SMF000	
02	(02)	DUMP HEADER		SMF002	
03	(03)	DUMP TRAILER		SMF003	
04	(04)	STEP TERMINATION		SMF004	page 6-6
05	(05)	JOB TERMINATION		SMF005	page 6-8
06	(06)	JES2 OUTPUT WRITER	SLF006	SMF006	page 6-10
06	(06)	EXTERNAL WRITER	SLF006	SMF006	page 6-10
06	(06)	PRINT SERVICES FACILITY	SLF006	SMF006	page 6-10
06	(06)	JES3 OUTPUT WRITER	SLF006	SMF006	page 6-10
07	(07)	DATA LOST		SMF007	
08	(08)	I/O CONFIGURATION		SMF008	
09	(09)	VARY DEVICE ONLINE		SMF009	
10	(0A)	ALLOCATION RECOVERY		SMF010	
11	(0B)	VARY DEVICE OFFLINE		SMF011	
14	(0E)	INPUT/RDBACK DSN ACTIVITY	SLF014	SMF014	page 6-11
15	(0F)	OUT,UPDAT,INOUT,OUTIN DSN	SLF015	SMF015	page 6-11
16	(10)	DFSORT STATISTICS		SMF016	
17	(11)	SCRATCH DATA SET STATUS		SMF017	
18	(12)	RENAME DATA SET STATUS		SMF018	
19	(13)	DIRECT ACCESS VOLUME		SMF019	
20	(14)	JOB INITIATION		SMF020	page 6-12
21	(15)	ERROR STATS BY VOLUME		SMF021	
22	(16)	CONFIGURATION	SLF022	SMF022	page 6-13
23	(17)	SMF STATUS		SMF023	
24	(18)	JES2 SPOOL OFFLOAD		SMF024	
25	(19)	JES3 DEVICE ALLOCATION		SMF025	
26	(1A)	JES2/JES3 JOB PURGE		SMF026	
30	(1E)	COMMON ADDRESS SPACE WORK		SMF030	page 6-14
31	(1F)	TIOC INITIALIZATION		SMF031	
32	(20)	TSO USER WORK ACCOUNTING		SMF032	
33	(21)	APPC/MVS TP ACCOUNTING		SMF033	page 6-15
34	(22)	TS-STEP TERMINATION		SMF034	page 6-15
35	(23)	LOGOFF		SMF035	page 6-17
36	(24)	ICF CATALOG EXPORT	SLFVSAM	SMF036	
40	(28)	DYNAMIC DD		SMF040	
41	(29)	DIV ACCESS/UNACCESS		SMF041	
42	(2A)	DFP STATS & CONFIGURATION		SMF042	
43	(2B)	JES2/JES3 START		SMF043	
45	(2D)	JES2/JES3 STOP		SMF045	
47	(2F)	JES2/JES3 SIGNON		SMF047	
48	(30)	JES2/JES3 SIGNOFF/STOP		SMF048	
49	(31)	JES2/JES3 INTEGRITY (BSC)		SMF049	
50	(32)	ACF/VTAM TUNING STATS		SMF050	

Table 6-1. Offline SMF Record Mapping. MVS JES V4 SMF Records

RECORD TYPE (Location 2)					
DEC	**(HEX)**	**Description**	**XREF Cross Reference**	**PLI Member**	**For Information See Page:**
52	(34)	JES2 LOGON/START (SNA)		SMF052	
53	(35)	JES2 LOGOFF/STOP (SNA)		SMF053	
54	(36)	JES2 INTEGRITY (SNA)		SMF054	
55	(37)	JES2 NETWORK SIGNON		SMF055	
56	(38)	JES2 NETWORK INTEGRITY		SMF056	
57	(39)	JES2/JES3 NETWORK TRANS		SMF057	
58	(3A)	JES2 NETWORK SIGNOFF		SMF058	
59	(3B)	MVS/BDT FILE-TO-FILE TRAN		SMF059	
60	(3C)	VVDS UPDATED	SLFVSAM	SMF060	page 6-18
61	(3D)	ICF DEFINE ACTIVITY	SLFVSAM	SMF061	page 6-22
62	(3E)	VSAM COMPONENT OPENED	SLFVSAM	SMF062	
63	(3F)	VSAM ENTRY DEFINED	SLFVSAM	SMF063	page 6-22
64	(40)	VSAM COMPONENT STATUS	SLFVSAM	SMF064	page 6-22
65	(41)	ICF DELETE ACTIVITY	SLFVSAM	SMF065	page 6-23
66	(42)	ICF ALTER ACTIVITY	SLFVSAM	SMF066	page 6-23
67	(43)	VSAM ENTRY DELETE	SLFVSAM	SMF067	page 6-24
68	(44)	VSAM ENTRY RENAMED	SLFVSAM	SMF068	
69	(45)	VSAM SPACE ALTERED	SLFVSAM	SMF069	
70	(46)	RMF CPU ACTIVITY		SMF070	
71	(47)	RMF PAGING ACTIVITY		SMF071	
72	(48)	RMF WORKLOAD AND STORAGE		SMF072	
73	(49)	RMF CHANNEL PATH ACTIVITY		SMF073	
74	(4A)	RMF DEVICE ACTIVITY		SMF074	
75	(4B)	RMF PAGE/SWAP DATASET		SMF075	
76	(4C)	RMF TRACE ACTIVITY		SMF076	
77	(4D)	RMF ENQUEUE ACTIVITY		SMF077	
78	(4E)	RMF MONITOR I ACTIVITY		SMF078	
79	(4F)	RMF MONITOR II ACTIVITY		SMF079	
80	(50)	RACF PROCESSING		SMF080	
81	(51)	RACF INITIALIZATION		SMF081	
82	(52)	PCF RECORD	SLF082	SMF082	page 6-24
83	(53)	RACF AUDIT FOR DATA SETS		SMF083	
84	(54)	JES3 MONITORING (JMF)	SLF084	SMF084	page 6-25
90	(5A)	SYSTEM STATUS	SLF090	SMF090	page 6-26
96	(60)	CROSS MEMORY CHARGEBACK		SMF096	
110	(6E)	CICS/ESA STATISTICS		SMF110	
170	(AA)	FILE-AID SMF AUDIT RECS		SMF170	page 6-27

Table 6-2 Online SMF Records Mapping

Table 6-2. Online SMF Record Mapping. MVS JES V4 SMF Records

RECORD TYPE (Location 2)					
DEC	**(HEX)**	**Description**	**XREF Cross Reference**	**PLI Member**	**For Information See Page:**
ALL		*ALL RECORD TYPES*	SLNALL	*ALL*	
00	(00)	IPL		SMN000	
02	(02)	DUMP HEADER		SMN002	
03	(03)	DUMP TRAILER		SMN003	
04	(04)	STEP TERMINATION		SMN004	page 6-6
05	(05)	JOB TERMINATION		SMN005	page 6-8
06	(06)	JES2 OUTPUT WRITER	SLN006	SMN006	page 6-10
06	(06)	EXTERNAL WRITER	SLN006	SMN006	page 6-10
06	(06)	PRINT SERVICES FACILITY	SLN006	SMN006	page 6-10
06	(06)	JES3 OUTPUT WRITER	SLN006	SMN006	page 6-10
07	(07)	DATA LOST		SMN007	
08	(08)	I/O CONFIGURATION		SMN008	
09	(09)	VARY DEVICE ONLINE		SMN009	
10	(0A)	ALLOCATION RECOVERY		SMN010	
11	(0B)	VARY DEVICE OFFLINE		SMN011	
14	(0E)	INPUT/RDBACK DSN ACTIVITY	SLN014	SMN014	page 6-11
15	(0F)	OUT,UPDAT,INOUT,OUTIN DSN	SLN015	SMN015	page 6-11
16	(10)	DFSORT STATISTICS		SMN016	
17	(11)	SCRATCH DATA SET STATUS		SMN017	
18	(12)	RENAME DATA SET STATUS		SMN018	
19	(13)	DIRECT ACCESS VOLUME		SMN019	
20	(14)	JOB INITIATION		SMN020	page 6-12
21	(15)	ERROR STATS BY VOLUME		SMN021	
22	(16)	CONFIGURATION	SLN022	SMN022	page 6-13
23	(17)	SMF STATUS		SMN023	
24	(18)	JES2 SPOOL OFFLOAD		SMN024	
25	(19)	JES3 DEVICE ALLOCATION		SMN025	
26	(1A)	JES2/JES3 JOB PURGE		SMN026	
30	(1E)	COMMON ADDRESS SPACE WORK		SMN030	page 6-14
31	(1F)	TIOC INITIALIZATION		SMN031	
32	(20)	TSO USER WORK ACCOUNTING		SMN032	
33	(21)	APPC/MVS TP ACCOUNTING		SMN033	page 6-15
34	(22)	TS-STEP TERMINATION		SMN034	page 6-15
35	(23)	LOGOFF		SMN035	page 6-17
36	(24)	ICF CATALOG EXPORT	SLNVSAM	SMN036	
40	(28)	DYNAMIC DD		SMN040	
41	(29)	DIV ACCESS/UNACCESS		SMN041	
42	(2A)	DFP STATS & CONFIGURATION		SMN042	
43	(2B)	JES2/JES3 START		SMN043	
45	(2D)	JES2/JES3 STOP		SMN045	
47	(2F)	JES2/JES3 SIGNON		SMN047	
48	(30)	JES2/JES3 SIGNOFF/STOP		SMN048	
49	(31)	JES2/JES3 INTEGRITY (BSC)		SMN049	
50	(32)	ACF/VTAM TUNING STATS		SMN050	

Table 6-2. Online SMF Record Mapping. MVS JES V4 SMF Records

RECORD TYPE (Location 2)					
DEC	**(HEX)**	**Description**	**XREF Cross Reference**	**PLI Member**	**For Information See Page:**
52	(34)	JES2 LOGON/START (SNA)		SMN052	
53	(35)	JES2 LOGOFF/STOP (SNA)		SMN053	
54	(36)	JES2 INTEGRITY (SNA)		SMN054	
55	(37)	JES2 NETWORK SIGNON		SMN055	
56	(38)	JES2 NETWORK INTEGRITY		SMN056	
57	(39)	JES2/JES3 NETWORK TRANS		SMN057	
58	(3A)	JES2 NETWORK SIGNOFF		SMN058	
59	(3B)	MVS/BDT FILE-TO-FILE TRAN		SMN059	
60	(3C)	VVDS UPDATED	SLNVSAM	SMN060	page 6-18
61	(3D)	ICF DEFINE ACTIVITY	SLNVSAM	SMN061	page 6-22
62	(3E)	VSAM COMPONENT OPENED	SLNVSAM	SMN062	
63	(3F)	VSAM ENTRY DEFINED	SLNVSAM	SMN063	page 6-22
64	(40)	VSAM COMPONENT STATUS	SLNVSAM	SMN064	page 6-22
65	(41)	ICF DELETE ACTIVITY	SLNVSAM	SMN065	page 6-23
66	(42)	ICF ALTER ACTIVITY	SLNVSAM	SMN066	page 6-23
67	(43)	VSAM ENTRY DELETE	SLNVSAM	SMN067	page 6-24
68	(44)	VSAM ENTRY RENAMED	SLNVSAM	SMN068	
69	(45)	VSAM SPACE ALTERED	SLNVSAM	SMN069	
70	(46)	RMF CPU ACTIVITY		SMN070	
71	(47)	RMF PAGING ACTIVITY		SMN071	
72	(48)	RMF WORKLOAD AND STORAGE		SMN072	
73	(49)	RMF CHANNEL PATH ACTIVITY		SMN073	
74	(4A)	RMF DEVICE ACTIVITY		SMN074	
75	(4B)	RMF PAGE/SWAP DATASET		SMN075	
76	(4C)	RMF TRACE ACTIVITY		SMN076	
77	(4D)	RMF ENQUEUE ACTIVITY		SMN077	
78	(4E)	RMF MONITOR I ACTIVITY		SMN078	
79	(4F)	RMF MONITOR II ACTIVITY		SMN079	
80	(50)	RACF PROCESSING		SMN080	
81	(51)	RACF INITIALIZATION		SMN081	
82	(52)	PCF RECORD	SLN082	SMN082	page 6-24
83	(53)	RACF AUDIT FOR DATA SETS		SMN083	
84	(54)	JES3 MONITORING (JMF)	SLN084	SMN084	page 6-25
90	(5A)	SYSTEM STATUS	SLN090	SMN090	page 6-26
96	(60)	CROSS MEMORY CHARGEBACK		SMN096	
110	(6E)	CICS/ESA STATISTICS		SMN110	
170	(AA)	FILE-AID SMF AUDIT RECS		SMN170	page 6-27

Record Type 4 (04) - Step Termination

Five 01 levels (see Figure 4-5 on page 4-5) are provided for type 04:

```
SMF_TYPE_4  (Base section always location 1)
SMF4_NON_SPOOL_DEVICE_ENTRY
SMF4_ACCOUNTING_SECTION
SMF4_ACCOUNTING_SECTION_CONTD
SMF4_RELOCATE_SECTION
```

The SMF_TYPE_4 layout defines the base portion of the record and is automatically selected by the SLxALL master XREF. In order to view any additional data sections for a type 04 SMF record, manual interaction is required. The procedure for viewing additional data sections is:

1. Scroll <DOWN> to see the last fields of the base layout, see Figure 6-1 on page 6-7. Examine base field number 32 (SMF4LENN_DVC_ENTRY_LENGTH) to determine the number of "NON_SPOOL" sections present.
2. If SMF4LENN_DVC_ENTRY_LENGTH is 0, skip to step 4 to map accounting sections or step 5 to map the relocate section.
3. If SMF4LENN_DVC_ENTRY_LENGTH is greater than 0 do the following:
   a. Calculate the number of "NON_SPOOL" entries (E) using the formula:

      ```
      E = (SMF4LENN_DVC_ENTRY_LENGTH - 2) / 8.
      ```

   b. Issue the command "USE NEXT SMF4_NON_SPOOL_DEVICE_ENTRY" "E" times, until all non-spool device entries have been mapped.

      Note: An information line is displayed indicating that additional record data remains to be mapped similar to the following:

      ```
      **** BOTTOM OF LAYOUT - DATA EXCEEDS LAYOUT BY 107 BYTES ********
      ```

      Note: If the number of entries (E) is greater than 1, the following command can be used for additional non-spool entries:

      ```
      USE NEXT *
      ```

4. After mapping all NON_SPOOL sections (if any), the ACCOUNTING_SECTION(s) may be mapped by using the following procedure:
   a. Issue the command "USE NEXT SMF4_ACCOUNTING_SECTION". This maps the accounting information fields and the first "ACCOUNTING_FIELD" section.
   b. Examine the field SMF4NAF_NO_ACCT_FIELDS to determine if any additional "ACCOUNTING_FIELD" sections are present.
   c. If SMF4NAF_NO_ACCT_FIELDS is 0 or 1, no more accounting sections are present and you may skip to step 5 to map the relocate section.
   d. If SMF4NAF_NO_ACCT_FIELDS is greater than 1 do the following:
      1. Issue the command "USE NEXT SMF4_ACCOUNTING_SECTION_CONTD" as many times as needed (SMF4NAF_NO_ACCT_FIELDS minus 1 times) until all accounting fields have been mapped.
5. In order to map the "RELOCATE_SECTION", examine the base section field number 31 (SMF4RLCT_OFFSET_TO_RELOC) to determine the location of where to "base" the "RELOCATE_SECTION" layout. (see Figure 6-1 on page 6-7.)

   Note: The command "USE 1 SMF_TYPE_4" may be issued to re-map the base portion of the type 04 record containing the SMF4RLCT_OFFSET_TO_RELOC field.

6. Issue the command “USE nnn SMF4_RELOCATE_SECTION”, where:
   - For offline data:

     ```
     nnn = (SMF4RLCT_OFFSET_TO_RELOC + 1)
     ```

   - For online data:

     ```
     nnn = (SMF4RLCT_OFFSET_TO_RELOC + 5)
     ```

   See Figure 6-1. The result of mapping the RELOCATE SECTION is shown in Figure 6-2 on page 6-8.

Figure 6-1. USE Command for Mapping Type 04 RELOCATE_SECTION

```
File-AID BROWSE - SYSTEM.SMF.DATA.DASDFILE ------------ UNPRINTABLE CHARACTERS
COMMAND ===> USE 134 SMF4_RELOCATE_SECTION                    SCROLL ===> CSR
RECORD:     1                        SMF_TYPE_4                    LENGTH:  235
---- FIELD NUMBER/NAME ------ COLUMNS- ----+----1----+----2----+----3----+----4
1 SMF4FLG_SYS_INDICATOR          1:0    00001110
2 SMF4RTY_RECORD_TYPE              2    X'04'
3 SMF4TME_TIME_RCD_MOVED           3    274095
4 SMF4DTE_DATE_RCD_MOVED           7    91220
5 SMF4SID_SYS_IDENT               11    9121
6 SMF4JBN_JOB_NAME                15    JOBXXXXX
7 SMF4RST_TIME_RDR_GOT_JOB        23    271784
8 SMF4RSD_DATE_RDR_GOT_JOB        27    91220
9 SMF4UIF_USER_ID                 31
10 SMF4STN_STEP_NUMBER            39    X'01'
11 SMF4SIT_TIME_INITIATOR         40    272246
12 SMF4STID_DATE_INITIATOR        44    91220
13 SMF4NCI_NO_CRD_IMAGES          48    0
14 SMF4SCC_STEP_COMPLETE_CODE     52    X'0000'
15 SMF4PRTY_ADDSPC_DSPTCH_PRI     54    X'09'
16 SMF4PGMN_PROGRAM_NAME          55    IEFBR14
17 SMF4STMN_STEP_NAME             63    IEFPROC
18 SMF4RSV5_RESERVED              71    0
19 SMF4SYST_LRGST_TOP_STG_USD     73    236
20 SMF4HOST_LRGST_BOT_STG_USD     75    340
21 SMF4RV1_RESERVED               77    0
22 SMF4RSHO_REGION_SZ_ESTAB       79    4096
23 SMF4SPK_STG_PROTECT_KEY        83    X'80'
24 SMF4STI_STEP_TERMINATE_IND   84:0    00000000
25 SMF4RV2_RESERVED               85    0
26 SMF4AST_DEV_ALLOC_START        87    272247
27 SMF4PPST_PROB_PROG_START       91    272380
28 SMF4RV3_RESERVED               95    X'00'
29 SMF4SRBT_STEP_CPU_TIME         96    X'000005'
30 SMF4RIN_RCD_INDICATOR        99:0    0000000000000000
31 SMF4RLCT_OFFSET_OF_RELOC      101    133 <=== RELOCATE_SECTION offset
32 SMF4LENN_DVC_ENTRY_LENGTH     103    26
********* BOTTOM OF LAYOUT - DATA EXCEEDS LAYOUT BY 131 BYTES ********* ********
```

Figure 6-2. Type 04 - Formatted Display of RELOCATE_SECTION

```
File-AID BROWSE - SYSTEM.SMF.DATA.DASDFILE ------------ UNPRINTABLE CHARACTERS
COMMAND ===>                                                SCROLL ===> CSR
RECORD:     1               SMF4_RELOCATE_SECTION              LENGTH:  235
---- FIELD NUMBER/NAME ------ COLUMNS- ----+----1----+----2----+----3----+----4
1 SMF4PGIN_NO_OF_PAGE_INS       134    0
2 SMF4PGOT_NO_OF_PAGE_OUTS      138    0
3 SMF4NSW_NO_ADDSPC_SWAPS       142    0
4 SMF4PSI_NO_PAGE_SWAPS_IN      146    0
5 SMF4PSO_NO_PAGE_SWAPS_OUT     150    0
6 SMF4VPI_NO_VIO_PAGE_SWAP_IN   154    0
7 SMF4VPO_NO_VIO_PAGE_SWAP_OT   158    0
8 SMF4SST_STEP_SERVICE_UNITS    162    20191
9 SMF4ACT_STEP_TRANS_ACTIV_TM   166    16621
10 SMF4PGNO_STP_PERF_GRP_NO     170    3
11 SMF4TRAN_STP_TRANS_RES_TME   172    16621
12 SMF4CPM_NO_PAGE_MISSES       176    0
13 SMF4RCLM_NO_VIO_RECLAIMS     180    0
14 SMF4CPGN_NO_COM_PAGE_INS     184    72
15 SMF4HSPI_NO_COM_RECLAIMS     188    0
16 SMF4PGST_NO_PAGES_STOLEN     192    0
17 SMF4PSEC_NO_PAGE_MSEC_4GIG   196    0
18 SMF4PSEC_NO_PAGE_MILLSECS    200    180857
19 SMF4LPAI_NO_LPA_PG_IN        204    72
20 SMF4HSPO_NO_LPA_RECLM        208    0
21 SMF4CPUS_STEP_CPU_SVC        212    9475
22 SMF4IOCS_STEP_IO_SVC         216    1235
23 SMF4MSOS_STEP_MAIN_STG       220    9127
24 SMF4SRBS_STEP_SRB_SVC        224    354
25 SMF4RSV1_RESERVED            228    X'0000000000000000'
****************************** BOTTOM OF DATA ********************************
```

Record Type 5 (05) - Job Termination

Three 01 levels are provided for type 05:

```
SMF_TYPE_5  (Base section always location 1)
SMF5_ACCOUNTING_SECTION_CONTD
SMF5_RELOCATE_SECTION
```

The SMF_TYPE_5 layout defines the base portion of the record and is automatically selected by the SLxALL master XREF. The base includes the first accounting section. In order to view any additional accounting sections or the relocate section for a type 05 SMF record, manual interaction is required. The procedure for viewing additional data sections is:

1. Scroll <DOWN> to see the last fields of the base layout. See Figure 6-3 on page 6-9. Examine base field number 35 (SMF5ACTF_NO_ACCT_FIELDS) to determine if any “accounting” sections are present. Type 05 records have a base section followed by 0 or more accounting sections followed by a relocate section. There is no field in the record that contains the offset of the relocate section, so in order to map the relocate section, you must first map all accounting sections and then the relocate section. Since the base layout (SMF_TYPE_5) maps the first accounting field, there are three variations of type 5 records possible: 0, 1, or greater than 1 accounting fields.
2. If SMF5ACTF_NO_ACCT_FIELDS is equal to 0, no accounting sections are present. The remaining data is the relocate section. To map the relocate section when SMF5ACTF_NO_ACCT_FIELDS is equal to 0, do the following:
   a. Issue the command “USE nnn SMF5_RELOCATE_SECTION”, where:
      - For offline data: **nnn = 118**
      - For online data: **nnn = 122**
3. If SMF5ACTF_NO_ACCT_FIELDS is equal to 1, the accounting data is already shown; to see the relocate section do the following:
   a. Issue the command “USE NEXT SMF5_RELOCATE_SECTION”.

4. If SMF5ACTF_NO_ACCT_FIELDS is greater than 1 do the following:

   a. Issue the command “USE NEXT SMF5_ACCOUNTING_SECTION_CONTD” as many times as needed (SMF5ACTF_NO_ACCT_FIELDS minus 1 times) until all accounting fields have been mapped.

   b. Issue the command “USE NEXT SMF5_RELOCATE_SECTION” to map the relocate section.

Figure 6-3. Formatted Display of Selected Type 05 Record Base Section

```
File-AID BROWSE - SYSTEM.SMF.DATA.DASDFILE ------------ UNPRINTABLE CHARACTERS
COMMAND ===>                                                 SCROLL ===> CSR
RECORD:     1                     SMF_TYPE_5                     LENGTH:  129
---- FIELD NUMBER/NAME ------ COLUMNS- ----+----1----+----2----+----3----+----4
1 SMF5FLG_SYS_INDICATOR          1:0    00001110
2 SMF5RTY_RECORD_TYPE              2    X'05'
3 SMF5TME_TIME_RCD_MOVED           3    274098
4 SMF5DTE_DATE_RCD_MOVED           7    91220
5 SMF5SID_SYS_IDENT               11    9121
6 SMF5JBN_JOB_NAME                15    JOBXXXXX
7 SMF5RST_TIME_RDR_GOT_JOB        23    271784
8 SMF5RSD_DATE_RDR_GOT_JOB        27    91220
9 SMF5UIF_USER_ID                 31
10 SMF5NST_NO_OF_STEPS            39    X'01'
11 SMF5JIT_TIME_GOT_INIT          40    272246
12 SMF5JID_DATE_GOT_INIT          44    91220
13 SMF5NCI_NO_CRD_IMAGES          48    0
14 SMF5JCC_JOB_COMP_CODE          52    X'0000'
15 SMF5JPTY_JOB_SEL_PRI           54    X'0D'
16 SMF5RSTT_TIME_END_JOB          55    271836
17 SMF5RSTD_DATE_END_JOB          59    91220
18 SMF5JBTI_JOB_TERM_IND         63:0   00000000
19 SMF5SMCI_RESERVED              64    X'00'
20 SMF5TRAN_JOB_TRANS_RES         65    16621
21 SMF5CKRE_RESERVED              69    X'00'
22 SMF5RDCL_RDR_DVC_CLASS         70    X'00'
23 SMF5RUTY_RDR_UNIT_TYPE         71    X'00'
24 SMF5JICL_JOB_INPUT_CLASS       72
25 SMF5SPK_STG_PROTECT_KEY        73    X'80'
26 SMF5SRBT_JOB_CPU_TIME          74    X'000005'
27 SMF5TJS_JOB_SVC_UNITS          77    20191
28 SMF5TTAT_TRANS_ACTIV_TIME      81    16621
29 SMF5RV2_RESERVED               85    0
30 SMF5PGNO_PERF_GROUP_NO         89    3
31 SMF5RV3_RESERVED               91    0
32 SMF5TLEN_LNG_REST_REC          93    X'18'
33 SMF5PRGN_PRGMR_NAME            94
34 SMF5JCPU_JOB_CPU_TIME         114    X'000074'
35 SMF5ACTF_NO_ACCT_FIELDS       117    X'00'     <== NO. ACCT FLDS
36 SMF5JSAF_ACCT_1_OF_N          118
  37 SMF5JSAF_1_LGTH            118:0   00000010                          (>=0)
  38 SMF5JSAF_1_DATA             X/CHAR X REFER SMF5JSAF_1_LGTH
                                 119    X'0025'
********* BOTTOM OF LAYOUT - DATA EXCEEDS LAYOUT BY 9 BYTES *********** ********
```

Record Type 6 (06) - JES2, PSF, EW, JES3

There are many possible variations and sub-segment combinations that may be written to SMF for the type 06 record. You may use a special XREF to automatically present the correct layout as follows:

- Offline type 06 records: **SLF006**
- Online type 06 records: **SLN006**

The XREF contains all the logic required to select the proper layout for any type 6 record being examined.

Be sure to use the appropriate existing supplied selection criteria member to select only type 6 records when using the SLF006 or SLN006 XREFs as illustrated in Figure 6-4.

Set your "Selection criteria usage" to "E" (Existing) and specify one of the following member names in the selection criteria dataset member field:

- Select offline type 06 records: **SCF006**
- Select online type 06 records: **SCN006**

Figure 6-4. Browse Screen for Selecting and Mapping SMF Type 6 (Online Data)

```
File-AID --------------  Browse - Dataset Specification  ----------------------
COMMAND ===>

Browse Mode                 ===> F          (F=Fmt; C=Char; V=Vfmt; U=Unfmt)

Specify Browse Information:
  Dataset name or HFS path ===> 'SYS1.MAN1'
  Member                   ===>            (Blank or pattern for member list)
  Volume serial            ===>            (If dataset is not cataloged)

Specify Record Layout and XREF Information:
  Record layout usage      ===> X          (S = Single; X = XREF; N = None)
  Record layout dataset    ===> FA.V8R7M0.SMF4.XREF
  Member                   ===>            (Blank or pattern for member list)
  XREF dataset             ===> FA.V8R7M0.SMF4.XREF
  Member                   ===> SLN006     (Blank or pattern for member list)

Specify Selection Criteria Information:     (E = Existing; T = Temporary;
  Selection criteria usage ===> E           M = Modify; Q = Quick; N = None)
  Selection criteria DSN   ===> FA.V8R7M0.SMF4.XREF
  Member                   ===> SCN006     (Blank or pattern for member list)
```

Record Type 14 (0E) - Input, Rdback Dataset

There are several possible variations and sub-segment combinations that may be written to SMF for the type 14 record. You may use a special XREF to automatically present the correct layout as follows:

- Offline type 14 and 15 records: **SLF014**
- Online type 14 and 15 records: **SLN014**

The XREF contains all the logic required to select the proper layout for any type 14 or 15 record being examined.

Be sure to use the appropriate existing supplied selection criteria member to select only type 14 and/or type 15 records when using the SLF014 or SLN014 XREFs.

Set your "Selection criteria usage" to "E" (Existing) and specify one of the following member names in the selection criteria dataset member field:

- Select offline type 14 or 15 records: **SCF01415**
- Select online type 14 or 15 records: **SCN01415**

Type 14 records contain a JFCB (Job File Control Block) section. The 176 byte JFCB is fully defined with field names.

Record Type 15 (0F) - Output Dataset

There are several possible variations and sub-segment combinations that you can write to SMF for the type 15 record. You may use a special XREF to automatically present the correct layout as follows:

- Offline type 14 or 15 records: **SLF015**
- Online type 14 or 15 records: **SLN015**

The XREF contains all the logic required to select the proper layout for any type 14 or 15 record being examined.

Be sure to use the appropriate existing supplied selection criteria member to select only type 14 and/or type 15 records when using the SLF014 or SLN014 XREFs.

Set your "Selection criteria usage" to "E" (Existing) and specify one of the following member names in the selection criteria dataset member field:

- Select offline type 14 or 15 records: **SCF01415**
- Select online type 14 or 15 records: **SCN01415**

Record Type 20 (14) - Job Initiation

Three 01 levels are provided for type 20:

```
SMF_TYPE_20 (Base section always location 1)
SMF20_ACCOUNTING_CONTD
SMF20_RELOCATE_SECTION
```

The SMF_TYPE_20 layout defines the base portion of the record and is automatically selected by the SLxALL master XREF. The base includes the first accounting section. In order to view any additional accounting sections or the relocate section for a type 20 SMF record, manual interaction is required. The procedure for viewing additional data sections is:

1. Scroll <DOWN> to see the last fields of the base layout. Examine base field SMF20NAF_NO_ACCT_FIELDS to determine if any "accounting" sections are present. Type 20 records have a base section following by 0 or more accounting sections followed by a relocate section. Field number 10 (SMF20RLO_OFFSET_TO_RELOC) describes the location of the relocate section so mapping additional accounting sections is always an option. Since the base layout (SMF_TYPE_20) maps the first accounting field, additional accounting fields may be present only when SMF20NAF_NO_ACCT_FIELDS is greater than 1. In this case, to see the additional accounting fields,
2. Issue the command "USE NEXT SMF20_ACCOUNTING_CONTD" as many times as needed (SMF20NAF_NO_ACCT_FIELDS minus 1 times) until all accounting fields have been mapped.
3. In order to map the "RELOCATE_SECTION", examine the base section field SMF20RLO_OFFSET_TO_RELOC to determine the location of where to "base" the "RELOCATE_SECTION" layout.

   Note: The command "USE 1 SMF_TYPE_20" may be issued to re-map the base portion of the type 20 record containing the SMF20RLO_OFFSET_TO_RELOC field.

4. Issue the command "USE nnn SMF20_RELOCATE_SECTION", where:
   - For offline data:

     ```
     nnn = (SMF20RLO_OFFSET_TO_RELOC + 1)
     ```

   - For online data:

     ```
     nnn = (SMF20RLO_OFFSET_TO_RELOC + 5)
     ```

Record Type 22 (16) - Configuration

Record type 22 consists of a base section followed by several possible occurrences of different configuration data sections. When viewing a type 22 record with the master XREF (SLFALL or SLNALL), and not all data sections are correctly mapped, you may use a special XREF for mapping the type 22 record as follows:

- Offline type 22 records: **SLF022**
- Online type 22 records: **SLN022**

The XREF contains all the logic required to select the proper layout for each "trailer" data segment possible for a type 22 record. The formatter primary command NEXT is used to move from segment to segment and to invoke the XREF's layout selection process.

Be sure to use the appropriate existing supplied selection criteria member to select only type 22 records when using the SLF022 or SLN022 XREFs.

Set your "Selection criteria usage" to "E" (Existing) and specify one of the following member names in the selection criteria dataset member field:

- Select offline type 22 records: **SCF022**
- Select online type 22 records: **SCN022**

When using the XREF SLx022, the base section of the type 22 record is presented first. To see any additional data segments, issue the NEXT primary command. The NEXT command invokes the XREF logic which determines which layout to select based on the value of the segment identification fields. Each segment has an identification byte in the second byte of the segment. The logic in the SLx022 XREF is designed to examine this byte and to select the appropriate layout for the type of segment found in the data.

To view additional segments, keep issuing the NEXT command until all segments have been mapped. The command "USE 1 SMF_TYPE_22" can be issued to return to the base segment of the record.

The command &NEXT can be used instead of NEXT when mapping type 22 records. Per ISPF conventions, when File-AID finds an ampersand (&) preceding any command, it leaves the command on the COMMAND line instead of clearing the COMMAND field. Using the &NEXT command means you only have to press <ENTER> to map the next segment.

The "01 level" layouts provided in the SMF022 and SMN022 members are as follows:

Figure 6-5. SMF022 Map - Segments Displayed with NEXT Command

```
File-AID ---- LIST OF AVAILABLE RECORD LAYOUTS --------------  ROW 1 TO 5 OF 5
COMMAND ===>                                                  SCROLL ===> CSR
             Member
  S    Nbr  name       01-level Name                  Status
 ---   --- --------  -----------------------------   ------------------------
         1 SMF022    SMF_TYPE_22_ALL                (complete record)
         2 SMF022    SMF_TYPE_22                    (base segment)
         3 SMF022    SMF22_CPU_SECTION              (type X'01')
         4 SMF022    SMF22_CHANNEL_SECTION          (type X'02')
         5 SMF022    SMF22_STORAGE_SECTION          (type X'03')
         6 SMF022    SMF22_MSS_IPL_CONFIG_SECT      (type X'04')
         7 SMF022    SMF22_VARY_ONLINE_SECTION      (type X'05')
         8 SMF022    SMF22_VARY_OFFLINE_SECTION     (type X'06')
         9 SMF022    SMF22_CHANNEL_PATH_SECTION     (type X'07')
        10 SMF022    SMF22_RECONFIG_CHAN_PATH       (type X'08')
        11 SMF022    SMF22_EXPANDED_STORAGE         (type X'09')
        12 SMF022    SMF22_STORAGE_CONTROL          (type X'0A')
****************************** BOTTOM OF DATA ********************************
```

Record Type 30 (1E) - Common Address Space

Two 01 levels are provided for type 30:

```
SMF_TYPE_30 (Entire record always location 1)
SMF30_ACCOUNTING_CONTD
```

The SMF_TYPE_30 layout is automatically selected by the SLxALL master XREF. The SMF_TYPE_30 layout defines the entire type 30 record and all occurrences of all sub-sections. The base layout includes all accounting data; however, if you need to break down the accounting section into individual fields, you can use the SMF30_ACCOUNTING_CONTD layout.

Note: The type 30 record is frequently changed by IBM. Be sure to check this layout against your data as described in "Validating an SMF Record Layout" on page 7-1.

One of the possible sections of information that may be present in a type 30 record is a variable number of variable length accounting fields. The field name used to describe all accounting fields in the accounting section is:

```
SMF30ACL_AND_SMF30ACT   (variable length accounting data)
```

If any accounting data is present in the type 30 record, the base field SMF30ALN_LTH_ACCT_SECT is greater than zero (0). When SMF30ALN_LTH_ACCT_SECT is greater than zero (0), you may use the following optional procedure for mapping individual variable length accounting fields:

1. Examine base field SMF30AOF_LOC_ACCT_SECT to determine the location of where to "base" the "ACCOUNTING_CONTD" layout.
2. Examine base field SMF30AON_NO_ACCT_SECTS to determine the number of accounting fields in the accounting data section.
3. Issue the command "USE nnn SMF30_ACCOUNTING_CONTD", where:
   - For offline data: **nnn = (SMF30AOF_LOC_ACCT_SECT + 1)**
   - For online data: **nnn = (SMF30AOF_LOC_ACCT_SECT + 5)**
4. If the field SMF30AON_NO_ACCT_SECTS was greater than 1, issue the command, **USE NEXT ***, for each additional accounting field to be mapped.

Record Type 33 (21) - APPC/MVS TP Accounting

Record type 33 has two different formats. Each format is identified by a "subtype" value.

The master XREF (SLFALL or SLNALL) provides the logic to fully map the base section (SMF_TYPE_33_SUB_x) of each known subtype. Type 33, subtype 1, records contain a variable number of relocatable self-defining information sections. To view any additional data sections for a type 33 subtype 1 record, you must intervene manually.

A separate copybook is provided for each relocatable data section in subtype 1. To map any occurrence or format of a relocatable segment of a type 33 subtype 1's record, issue the USE command, see Figure 6-6 for a list of valid Copybook Names.:

```
USE nnn SMF33_1_xxx       (nnn = section offset +1 (offline)
                           xxx = section name)
or

USE nnn                   (no Copybook name to see Layouts Table)
```

Relocatable section offsets are usually contained in the subtype base header fields.

Note: The command **USE 1 SMF_TYPE_33_SUB_1** may be issued to remap the base portion of a type 33 subtype 1 record.

Figure 6-6. Type 33 Copybooks for Subtype 1 Data Sections

```
File-AID ---- LIST OF AVAILABLE RECORD LAYOUTS --------------  ROW 1 TO 5 OF 5
COMMAND ===>                                                  SCROLL ===> CSR
             Member
  S    Nbr   name       01-level Name                  Status
 ---   ---  --------  -------------------------------  -------------------------
            SMN033    SMF_TYPE_33_SUB_1
            SMN033    SMF_TYPE_33_SUB_2
            SMN033    SMF33_1_TPID_SECT               NOT REFERENCED
            SMN033    SMF33_1_TPUS_SECT               NOT REFERENCED
            SMN033    SMF33_1_TP_USAGE_DETL_SECT      NOT REFERENCED
            SMN033    SMF33_1_USAGE_SCHED_SECT        NOT REFERENCED
            SMN033    SMF33_ACCOUNTING_AREA           NOT REFERENCED
```

Record Type 34 (22) - TS-Step Termination

The type 34 record is very similar to the type 4 (step termination) SMF record. (See "Record Type 4 (04) - Step Termination" on page 6-6.)

Five 01 levels are provided for type 34:

```
SMF_TYPE_34  (Base section always location 1)
SMF34_NON_SPOOL_DVC_SECTION
SMF34_ACCNTING_SECTION
SMF34_ACCNTING_CONTD
SMF34_RELOCATE_SECTION
```

The SMF_TYPE_34 layout defines the base portion of the record and is automatically selected by the SLxALL master XREF. In order to view any additional data sections for a type 34 SMF record, manual interaction is required. The procedure for viewing additional data sections is:

1. Scroll <DOWN> to see the last fields of the base layout. Examine base field number 32 (TIVVAR_LTH_EXCP_FLDS) to determine if any "NON_SPOOL" sections are present.
2. If TIVVAR_LTH_EXCP_FLDS is 0, skip to step 4 to map accounting sections or step 5 to map the relocate section.
3. If TIVVAR_LTH_EXCP_FLDS is greater than 0 do the following:
   a. Calculate the number of "NON_SPOOL" entries (E) using the formula:

      ```
      E = (TIVVAR_LTH_EXCP_FLDS - 2) / 8.
      ```

   b. Issue the command "USE NEXT SMF34_NON_SPOOL_DVC_SECTION" "E" times, until all non-spool device entries have been mapped.

      Note: An information line is displayed indicating that additional record data remains to be mapped similar to the following:

      ```
      ******** BOTTOM OF LAYOUT - DATA EXCEEDS LAYOUT BY 107 BYTES ********
      ```

      Note: If the number of entries (E) is greater than 1, the following command can be used for additional non-spool entries:

      ```
      USE NEXT *
      ```

4. After mapping all NON_SPOOL sections (if any), the ACCOUNTING_SECTION(s) may be mapped by using the following procedure:
   a. Issue the command "USE NEXT SMF34_ACCNTING_SECTION". This maps the accounting information fields and the first "ACCOUNTING_FIELD" section.
   b. Examine the field TIVNBRAC_NO_ACCT_FIELDS to determine if any additional "ACCOUNTING_FIELD" sections are present.
   c. If TIVNBRAC_NO_ACCT_FIELDS is 0 or 1, no more accounting sections are present and you may skip to step 5 to map the relocate section.
   d. If TIVNBRAC_NO_ACCT_FIELDS is greater than 1 do the following:
      1. Issue the command "USE NEXT SMF34_ACCNTING_CONTD" as many times as needed (TIVNBRAC_NO_ACCT_FIELDS minus 1 times) until all accounting fields have been mapped.
5. To map the "RELOCATE_SECTION", examine the base section field number 31 (TIVRLCT_OFSET_RELOCT_SECT) to determine the location of where to "base" the "RELOCATE_SECTION" layout.

   Note: The command "USE 1 SMF_TYPE_34" may be issued to re-map the base portion of the type 34 record containing the TIVRLCT_OFSET_RELOCT_SECT field.

6. Issue the command "USE nnn SMF34_RELOCATE_SECTION", where:
   – For offline data: **nnn = (TIVRLCT_OFSET_RELOCT_SECT + 1)**
   – For online data: **nnn = (TIVRLCT_OFSET_RELOCT_SECT + 5)**

Record Type 35 (23) - Logoff

The type 35 record is very similar to the type 5 (job termination) SMF record. (See "Record Type 5 (05) - Job Termination" on page 6-8.)

Three 01 levels are provided for type 35:

```
SMF_TYPE_35  (Base section always location 1)
SMF35_ACCNTING_CONTD
SMF35_RELOCATE_SECTION
```

The SMF_TYPE_35 layout defines the base portion of the record and is automatically selected by the SLxALL master XREF. In order to view any additional data sections for a type 35 SMF record, you must use manual interaction. The procedure for viewing additional data sections is:

1. Scroll <DOWN> to see the last fields of the base layout. Examine base field number 32 (TLGNBRAC_NO_ACCT_FLDS) to determine if any "accounting" sections are present. Type 35 records have a base section followed by 0 or more accounting sections followed by a relocate section. There is no field in the record that contains the offset of the relocate section, so in order to map the relocate section, all accounting sections must be mapped first, then the relocate section is next. Since the base layout (SMF_TYPE_35) maps the first accounting field, there are three variations of type 35 records possible: 0, 1, or greater than 1 accounting fields.
2. If TLGNBRAC_NO_ACCT_FLDS is equal to 0, no accounting sections are present. The remaining data is the relocate section. To map the relocate section when TLGNBRAC_NO_ACCT_FLDS is equal to 0, do the following:
   a. Issue the command "USE nnn SMF35_RELOCATE_SECTION", where:
      - For offline data: **nnn = 118**
      - For online data: **nnn = 122**
3. If TLGNBRAC_NO_ACCT_FLDS is equal to 1 the accounting data is already shown, to see the relocate section do the following:
   a. Issue the command "USE NEXT SMF35_RELOCATE_SECTION".
4. If TLGNBRAC_NO_ACCT_FLDS is greater than 1 do the following:
   a. Issue the command "USE NEXT SMF35_ACCNTING_CONTD" as many times as needed (TLGNBRAC_NO_ACCT_FLDS minus 1 times) until all accounting fields have been mapped.
   b. Issue the command "USE NEXT SMF35_RELOCATE_SECTION" to map the relocate section.

Record Type 60 (3C) - VVDS Updated

Record type 60 consists of a base section followed by several possible occurrences of different VVDS record data sections. When viewing a type 60 record with the master XREF (SLFALL or SLNALL), only the base portion of the record is mapped. The formatter primary command NEXT may be issued to reveal the first section of the VVDS record. Any subsequent VVDS record segments must be manually mapped via the USE NEXT command.

To automate the mapping of VVDS record segments, you may use a special XREF for mapping the type 60 record as follows:

- Offline VSAM related record types 36, and 60 through 69: **SLFVSAM**
- Online VSAM related record types 36, and 60 through 69: **SLNVSAM**

The XREF contains all the logic required to select the proper layout for each "trailer" data segment possible for a type 60 record. The formatter primary command NEXT is used to move from segment to segment and to invoke the XREF's layout selection process.

Be sure to use the appropriate existing supplied selection criteria member to select only type 36, and 60 thru 69 records when using the SLFVSAM or SLNVSAM XREFs.

Set your "Selection criteria usage" to "E" (Existing) and specify one of the following member names in the selection criteria dataset member field:

- Select offline VSAM type records: **SCFVSAM**
- Select online VSAM type records: **SCNVSAM**

Note: The SLFVSAM and SLNVSAM XREFs simultaneously support mapping for type 36 (24), 60 (3C), 61 (3D), 62 (3E), 63 (3F), 64 (40), 65 (41), 66 (42), 67 (43), 68 (44), and 69 (45) records. Any or all of these record types can be selected at one time.

When using the XREF SLxVSAM, the base section of the type 60 record is presented first. To see any additional data segments, issue the primary command NEXT. The NEXT command invokes the XREF logic which determines which layout to select based on the value of the segment identification fields. Each segment has an identification byte in the second or fourth byte of the segment. The logic in the SLxVSAM XREF is designed to examine this byte and to select the appropriate layout for the type of segment found in the data.

To view additional segments, keep issuing the NEXT command until all segments have been mapped. To return to the base segment of the record, issue the USE 1 SMF_TYPE_60 command.

Use the command &NEXT instead of NEXT when mapping type 60 records. Per ISPF conventions, when File-AID finds an ampersand (&) preceding any command, it leaves the command on the COMMAND line instead of clearing the COMMAND field. If you use the &NEXT command, you only have to press <Enter> to map the next segment.

The source for the type 60 record base is kept in member SMF060 and SMN060. The source for the VVDS record information cells is maintained in member SMFVVDS.

The 01 level Copybook layouts accessible in the SLFVSAM and SLNVSAM XREFs are as follows:

Figure 6-7. SLFVSAM - Available Layouts for Catalog Record Mapping

```
File-AID ---- LIST OF AVAILABLE RECORD LAYOUTS --------------  ROW 1 TO 5 OF 5
COMMAND ===>                                                  SCROLL ===> CSR
            Member
  S    Nbr  name       01-level Name                  Status
 ---   ---  --------   -----------------------------  ------------------------
         1  SMFVVDS    VSAM_VOLREC_A_NONVSAM_NAME_CEL
         2  SMFVVDS    VSAM_VOLREC_B_GDG_NAME_CELL
         3  SMFVVDS    VSAM_VOLREC_C_CLUSTER_NAME_CEL
         4  SMFVVDS    VSAM_VOLREC_D_DATA_NAME_CELL
         5  SMFVVDS    VSAM_VOLREC_E_VSAM_XTSN_NAME_C
         6  SMFVVDS    VSAM_VOLREC_G_AIX_NAME_CELL
         7  SMFVVDS    VSAM_VOLREC_H_GEN_DSN_NAME_CEL
         8  SMFVVDS    VSAM_VOLREC_I_INDEX_NAME_CELL
         9  SMFVVDS    VSAM_VOLREC_J_GDG_XTSN_NAME_CE
        10  SMFVVDS    VSAM_VOLREC_Q_SECDRY_VVR_HDR_C
        11  SMFVVDS    VSAM_VOLREC_R_PATH_NAME_CELL
        12  SMFVVDS    VSAM_VOLREC_T_TRUENAME_CELL
        13  SMFVVDS    VSAM_VOLREC_U_ICF_CONNECTOR_CE
        14  SMFVVDS    VSAM_VOLREC_X_ALIAS_NAME_CELL
        15  SMFVVDS    VSAM_VOLREC_XX_GENERIC
        16  SMFVVDS    VSAM_VOLREC_Z_PRIME_VVR_HDR_CE
        17  SMFVVDS    VSAM_VOLREC_01_OWNERSHIP_CELL
        18  SMFVVDS    VSAM_VOLREC_02_SECURITY_CELL
        19  SMFVVDS    VSAM_VOLREC_03_ASSOCIATION_CEL
        20  SMFVVDS    VSAM_VOLREC_04_NONVSAM_VOLUME_
        21  SMFVVDS    VSAM_VOLREC_04_VSAM_VOLUME_CEL
        22  SMFVVDS    VSAM_VOLREC_05_GEN_AGING_TABL_
        23  SMFVVDS    VSAM_VOLREC_06_RELATIONSHIP_CE
        24  SMFVVDS    VSAM_VOLREC_21_DATASET_INFO_CE
        25  SMFVVDS    VSAM_VOLREC_21_DATASET_INFO_LO
        26  SMFVVDS    VSAM_VOLREC_23_VOLUME_INFO_CEL
        27  SMFVVDS    VSAM_VOLREC_60_DATA_STATS_BLK_
        28  SMF036     SMF_TYPE_36_ICF_CATALOG
        29  SMF060     SMF_TYPE_60
        30  SMF061     SMF_TYPE_61
        31  SMF062     SMF_TYPE_62
        32  SMF063     SMF_TYPE_63
        33  SMF064     SMF_TYPE_64
        34  SMF065     SMF_TYPE_65
        35  SMF066     SMF_TYPE_66
        36  SMF067     SMF_TYPE_67
        37  SMF068     SMF_TYPE_68
        38  SMF069     SMF_TYPE_69
        39  SMFVVDS    VSAM_VOLREC_03_ASCKEY_OVERLAY    NOT REFERENCED
        40  SMFVVDS    VSAM_VOLREC_06_RELCELL_OVERLAY   NOT REFERENCED
        41  SMFVVDS    VSAM_VOLREC_23_VOLUME_INFO_XTN   NOT REFERENCED
        42  SMF064     SMF64_EACH_EXTENT_ENTRY_DATA     NOT REFERENCED
```

Notes:

1. The copybook names show in Figure 6-7 are also accessible via the USE command when you are using the SLFALL or SLNALL XREFs.
2. When using the SMFVSAM or SMNVSAM automatic XREFs to map VVDS record segments, the layout “VSAM_VOLREC_XX_GENERIC” may be displayed after a NEXT command. If this happens, the segment at this location is unknown. Manual interpretation of the segment data is required and the NEXT command does not properly determine the next segment of data. Since most segments have a 2 byte length value, it may be possible to issue a command to map the segment following the unknown segment.

The procedure is:

1. Add the value of VOLREC_LTH field to location of VOLREC_LTH field. (See Figure 6-8 on page 6-20).
2. Issue the command: `USE nnn *`.
   Where nnn is result of step 1 calculation.
3. Examine the first byte of VOLREC_DATA to see segment type code. (See Figure 6-9 on page 6-20).

4. Issue the USE command to view AVAILABLE LAYOUTS. Then select the Copybook that matches the hex value of the segment type code. (See Figure 6-10 on page 6-21).
5. The correct segment layout should now be displayed. Continue issuing the NEXT command for automatic layout selection. See Figure 6-11 on page 6-21.

Figure 6-8. Manual NEXT Segment Mapping for XX_GENERIC Catalog Cell

```
File-AID BROWSE - SYSTEM.SMF.DATA.DASDFILE ------------ UNPRINTABLE CHARACTERS
COMMAND ===> USE 259 *                                      SCROLL ===> CSR
RECORD:   107              VSAM_VOLREC_XX_GENERIC               LENGTH:  300
---- FIELD NUMBER/NAME ------ COLUMNS- ----+----1----+----2----+----3----+----4


1 VOLREC_LTH     (OFFSET) ====> 207    52 <==== (PLUS LENGTH)            (>=0)


2 VOLREC_DATA                  X/CHAR X REFER VOLREC_LTH
                               209    X'E20000012DC2C7E2D7C44BC2C4C1E2C44BD9F1
                               228    F2F2D74BD3D6C1C4404040404040404040404040
                               248    4040404040404040404040000014'
********* BOTTOM OF LAYOUT -
DATA EXCEEDS LAYOUT BY 40 BYTES ********** ********
```

Figure 6-9. USE Command to Access Available Layouts for Catalog Cells

```
File-AID BROWSE - SYSTEM.SMF.DATA.DASDFILE ------------ UNPRINTABLE CHARACTERS
COMMAND ===> USE                                            SCROLL ===> CSR
RECORD:   107              VSAM_VOLREC_XX_GENERIC               LENGTH:  300
---- FIELD NUMBER/NAME ------ COLUMNS- ----+----1----+----2----+----3----+----4
1 VOLREC_LTH                   259    20                                 (>=0)
2 VOLREC_DATA                  X/CHAR X REFER VOLREC_LTH
    (FIRST DATA BYTE (X'01')==> 261    X'01FFFFFFFFFFFFFFFF0891220F00000F000000
                               280    16'
********* BOTTOM OF LAYOUT -
DATA EXCEEDS LAYOUT BY 20 BYTES ********** ********
```

Figure 6-10. Selecting a Copybook from the Layouts List

```
File-AID ---- LIST OF AVAILABLE RECORD LAYOUTS --------------  ROW 1 TO 5 OF 5
COMMAND ===>                                                  SCROLL ===> CSR
             Member
  S    Nbr   name       01-level Name                  Status
 ---   ---  --------  -------------------------------  ------------------------
         1  SMFVVDS   VSAM_VOLREC_A_NONVSAM_NAME_CEL
         2  SMFVVDS   VSAM_VOLREC_B_GDG_NAME_CELL
         3  SMFVVDS   VSAM_VOLREC_C_CLUSTER_NAME_CEL
         4  SMFVVDS   VSAM_VOLREC_D_DATA_NAME_CELL
         5  SMFVVDS   VSAM_VOLREC_E_VSAM_XTSN_NAME_C
         6  SMFVVDS   VSAM_VOLREC_G_AIX_NAME_CELL
         7  SMFVVDS   VSAM_VOLREC_H_GEN_DSN_NAME_CEL
         8  SMFVVDS   VSAM_VOLREC_I_INDEX_NAME_CELL
         9  SMFVVDS   VSAM_VOLREC_J_GDG_XTSN_NAME_CE
        10  SMFVVDS   VSAM_VOLREC_Q_SECDRY_VVR_HDR_C
        11  SMFVVDS   VSAM_VOLREC_R_PATH_NAME_CELL
        12  SMFVVDS   VSAM_VOLREC_T_TRUENAME_CELL
        13  SMFVVDS   VSAM_VOLREC_U_ICF_CONNECTOR_CE
        14  SMFVVDS   VSAM_VOLREC_X_ALIAS_NAME_CELL
        15  SMFVVDS   VSAM_VOLREC_XX_GENERIC           CURRENT MAP
        16  SMFVVDS   VSAM_VOLREC_Z_PRIME_VVR_HDR_CE
 S      17  SMFVVDS   VSAM_VOLREC_01_OWNERSHIP_CELL
        18  SMFVVDS   VSAM_VOLREC_02_SECURITY_CELL
        19  SMFVVDS   VSAM_VOLREC_03_ASSOCIATION_CEL
        20  SMFVVDS   VSAM_VOLREC_04_NONVSAM_VOLUME_
        21  SMFVVDS   VSAM_VOLREC_04_VSAM_VOLUME_CEL
        22  SMFVVDS   VSAM_VOLREC_05_GEN_AGING_TABL_
        23  SMFVVDS   VSAM_VOLREC_06_RELATIONSHIP_CE
        24  SMFVVDS   VSAM_VOLREC_21_DATASET_INFO_CE
        25  SMFVVDS   VSAM_VOLREC_21_DATASET_INFO_LO
        26  SMFVVDS   VSAM_VOLREC_23_VOLUME_INFO_CEL
        27  SMFVVDS   VSAM_VOLREC_60_DATA_STATS_BLK_
```

Figure 6-11. Segment Type X'01' Mapped (VSAM_VOLREC_01_OWNERSHIP_CELL)

```
File-AID BROWSE - SYSTEM.SMF.DATA.DASDFILE ------------ UNPRINTABLE CHARACTERS
COMMAND ===> &NEXT                                          SCROLL ===> CSR
RECORD:   107            VSAM_VOLREC_01_OWNERSHIP_CELL          LENGT
---- FIELD NUMBER/NAME ------ COLUMNS- ----+----1----+----2----+----3--
1 OWNCELLN_LTH                  259    20
2 OWNTYPE_01                    261    X'01'
3 OWNID_OWNER_ID                262    X'FFFFFFFFFFFFFFFF'
4 OWNFLAG_BITS                270:0    00001000
5 OWNCREDT_CREATE_DT            271    X'91220F'
6 OWNEXPDT_EXPIRE_DT            274    X'00000F'
7 OWNEND_19_20                  277    X'0000'
********* BOTTOM OF LAYOUT - DATA EXCEEDS LAYOUT BY 22 BYTES **********
```

Record Type 61 (3D) - ICF Define Activity

Record type 61 is constructed just like a type 60 record. It consists of a base section followed by several possible occurrences of different VVDS record data sections. When viewing a type 61 record with the master XREF (SLFALL or SLNALL), only the base portion of the record is mapped. You can issue the formatter primary command NEXT to reveal the first section of the VVDS record. You must use the USE NEXT command to manually map any subsequent VVDS record segments.

To automate the mapping of VVDS record segments, you may use a special XREF for mapping the type 61 record as follows:

- Offline VSAM related record types 36, and 60 through 69: **SLFVSAM**
- Online VSAM related record types 36, and 60 through 69: **SLNVSAM**

See "Record Type 60 (3C) - VVDS Updated" on page 6-18 for detailed mapping instructions.

Record Type 63 (3F) - VSAM Catalog Define

Record type 63 is constructed just like a type 60 record. It consists of a base section followed by several possible occurrences of different VVDS record data sections. When viewing a type 63 record with the master XREF (SLFALL or SLNALL), only the base portion of the record is mapped. The formatter primary command NEXT may be issued to reveal the first section of the VVDS record. Any subsequent VVDS record segments must be manually mapped via the USE NEXT command.

To automate the mapping of VVDS record segments, you may use a special XREF for mapping the type 63 record as follows:

- Offline VSAM related record types 36, and 60 through 69: **SLFVSAM**
- Online VSAM related record types 36, and 60 through 69: **SLNVSAM**

Record Type 64 (40) - VSAM Component Status

Two 01 levels are provided for type 64:

```
SMF_TYPE_64 (Entire record always location 1)
SMF64_EACH_EXTENT_ENTRY_DATA
```

The SMF_TYPE_64 layout defines the entire type 64 record and all occurrences of all sub-sections. It is automatically selected by the SLxALL master XREF. You may also use the SLxVSAM XREF for type 64 mapping.

Note: The type 64 record may be revised by IBM. Be sure to check this layout against your data as described in "Validating an SMF Record Layout" on page 7-1.

One of the possible sections of information that may be present in a type 64 record is a variable number of fixed length extent information fields. In the SMF_TYPE_64 layout, all extent information is treated as one large variable length character string in a field named:

```
SMF64_ALL_EXT_ENTRS_DATA (all extent sections data)
```

If any extent data is present in the type 64 record, the base field SMF64ESL_LTH is greater than zero (0). The optional procedure for mapping individual extent data section fields is:

1. Examine the offset of field SMF64_ALL_EXT_ENTRS_DATA to determine the location of where to "base" the first "EXTENT_ENTRY_DATA" layout. (To view field offset, use SHOW OFFSET and OFFSET COLUMN commands to tailor the formatted display.)
2. Calculate the number of "EXTENT" entries (E) using the formula:

   ```
   E = (SMF64ESL_LTH) / 26.
   ```

3. Issue the command "USE nnn SMF64_EACH_EXTENT_ENTRY_DATA", where

   ```
   nnn = Offset of field SMF64_ALL_EXT_ENTRS_DATA (see step 1)
   ```

4. If the number of entries (E) is greater than 1 issue the following command for each additional extent entry to be mapped:

   ```
   USE NEXT *
   ```

Record Type 65 (41) - ICF Delete Activity

Record type 65 is constructed just like a type 60 record. It consists of a base section followed by several possible occurrences of different VVDS record data sections. When viewing a type 65 record with the master XREF (SLFALL or SLNALL), only the base portion of the record is mapped. You may issue the format primary command NEXT to reveal the first section of the VVDS record. You must use the USE NEXT command to manually map any subsequent VVDS record segments.

To automate the mapping of VVDS record segments, use a special XREF for mapping the type 65 record as follows:

- Offline VSAM related record types 36, and 60 through 69: **SLFVSAM**
- Online VSAM related record types 36, and 60 through 69: **SLNVSAM**

Record Type 66 (42) - ICF Alter Activity

Record type 66 is constructed just like a type 60 record. It consists of a base section followed by several possible occurrences of different VVDS record data sections. When viewing a type 66 record with the master XREF (SLFALL or SLNALL), only the base portion of the record is mapped. You may issue the formatter primary command NEXT to reveal the first section of the VVDS record. Use the USE NEXT command to manually map any subsequent VVDS record segments.

To automate the mapping of VVDS record segments, you may use a special XREF for mapping the type 66 record as follows:

- Offline VSAM related record types 36, and 60 through 69: **SLFVSAM**
- Online VSAM related record types 36, and 60 through 69: **SLNVSAM**

Record Type 67 (43) - VSAM Entry Delete

Record type 67 is constructed just like a type 60 record. It consists of a base section followed by several possible occurrences of different VVDS record data sections. When viewing a type 67 record with the master XREF (SLFALL or SLNALL), only the base portion of the record is mapped. You may issue the formatter primary command NEXT to reveal the first section of the VVDS record. Any subsequent VVDS record segments must be manually mapped via the USE NEXT command.

To automate the VVDS record segments mapping, you may use a special XREF for mapping the type 67 record as follows:

- Offline VSAM related record types 36, and 60 through 69: **SLFVSAM**
- Online VSAM related record types 36, and 60 through 69: **SLNVSAM**

See "Record Type 60 (3C) - VVDS Updated" on page 6-18 for detailed mapping instructions.

Record Type 82 (52) - Cryptographic

Record type 82 for CUSP (Cryptographic Unit Support Program) formats consists of a base section followed by several possible occurrences of different relocatable information sections.

A second format of type 82 record, the ICSF/MVS (Integrated Cryptographic Service Facility), is available with MVS/JES Version 4.

The master XREF (SLFALL or SLNALL) does not provide the logic to fully map all relocatable sections of the CUSP format of type 82 records. It also does not contain the logic required to select the proper ICSF/MVS subtype layout (there are seven possible variations or "subtypes" of ICSF/MVS format of type 82 records). To handle these needs you may use a special XREF for mapping the type 82 record as follows:

- Offline type 82 records: **SLF082**
- Online type 82 records: **SLN082**

Be sure to use the appropriate existing supplied selection criteria member to select only type 82 records when using the SLF082 or SLN082 XREFs.

Set your "Selection criteria usage" to "E" (Existing) and specify one of the following member names in the selection criteria dataset member field:

- Select offline type 82 records: **SCF082**
- Select online type 82 records: **SCN082**

The XREFs contain all the logic required to select the proper layout for the base of each CUSP or ICSF/MVS record.

For ICSF/MVS formatted subtypes, no other mapping is required. However, for CUSP formats, issue the primary command NEXT to see any additional relocatable data sections.

To view additional segments, keep issuing the NEXT command until all segments have been mapped. The command "USE 1 SMF_TYPE_82" can be issued to return to the base segment of the record.

The &NEXT command can be used instead of NEXT when mapping type 82 records. Per ISPF conventions, when File-AID finds an ampersand (&) preceding any command, it leaves the command on the COMMAND line instead of clearing the COMMAND field. Using the &NEXT command means you only have to press <Enter> to map the next segment.

Record Type 84 (54) - JES3 Monitoring

Record type 84 has nine different formats. Each format is identified by a "subtype" value.

The master XREF (SLFALL or SLNALL) does not provide the logic to fully map all relocatable sections of type 84 records. It also does not contain the logic required to select the proper type 84 subtype layout (there are nine possible variations or "subtypes" of type 84 records). To handle these needs, use a special XREF for mapping the type 84 record as follows:

- Offline type 84 records: **SLF084**
- Online type 84 records: **SLN084**

Be sure to use the appropriate existing supplied selection criteria member to select only type 84 records when using the SLF084 or SLN084 XREFs.

Set your "Selection criteria usage" to "E" (Existing) and specify one of the following member names in the selection criteria dataset member field:

- Select offline type 84 records: **SCF084**
- Select online type 84 records: **SCN084**

The XREFs contain all the logic required to select the proper layout for the base section (SMF_TYPE_84_SUBTYPE_x) of each known subtype. Some subtypes also contain a variable number of relocatable information sections. In order to view any additional data sections for a type 84 SMF record subtype, you must use manual interaction.

A separate copybook is provided for each relocatable data section in each subtype. To map any occurrence or format of a relocatable segment of a type 84 subtype's record, issue the USE command: (See Figure 6-12 on page 6-26 for a list of valid Copybook Names.)

```
USE nnn SMF84_SUBt_xxx    (nnn = section offset
                              t = subtype
                            xxx = section name)
or

USE nnn                   (no Copybook name to see Layouts List)
```

Relocatable section offsets are usually contained in the subtype base header fields.

Notes:

1. The command "USE 1 SMF_TYPE_84_SUBTYPE_t" may be issued to re-map the base portion of a type 84 record subtype.
2. Some subtypes have very complex relocatable sections and may be difficult to fully map.

Figure 6-12. Type 84 Copybooks for Subtype Trailer Segments

```
File-AID ---- LIST OF AVAILABLE RECORD LAYOUTS --------------  ROW 1 TO 5 OF 5
COMMAND ===>                                                  SCROLL ===> CSR
            Member
  S    Nbr  name       01-level Name                  Status
 ---   ---  --------  -----------------------------  ------------------------
            SMF084    SMF_TYPE_84_SUBTYPE_1
            SMF084    SMF_TYPE_84_SUBTYPE_2
            SMF084    SMF_TYPE_84_SUBTYPE_3
            SMF084    SMF_TYPE_84_SUBTYPE_4
            SMF084    SMF_TYPE_84_SUBTYPE_5
            SMF084    SMF_TYPE_84_SUBTYPE_6
            SMF084    SMF_TYPE_84_SUBTYPE_7
            SMF084    SMF_TYPE_84_SUBTYPE_8
            SMF084    SMF_TYPE_84_SUBTYPE_9
            SMF084    SMF84_SUB1_FCT_ANALYSIS_HDR      NOT REFERENCED
            SMF084    SMF84_SUB1_GENR_INFO             NOT REFERENCED
            SMF084    SMF84_SUB1_IRB_HDR               NOT REFERENCED
            SMF084    SMF84_SUB1_FCT_AWT_ANALYSIS      NOT REFERENCED
            SMF084    SMF84_SUB1_FCT_ENTRY             NOT REFERENCED
            SMF084    SMF84_SUB1_AWAIT_STD             NOT REFERENCED
            SMF084    SMF84_SUB1_AWAIT_ALOAD           NOT REFERENCED
            SMF084    SMF84_SUB1_AWAIT_FDB             NOT REFERENCED
            SMF084    SMF84_SUB1_AWAIT_SDM             NOT REFERENCED
            SMF084    SMF84_SUB1_AWAIT_AENQ            NOT REFERENCED
            SMF084    SMF84_SUB1_AWAIT_CONBUF          NOT REFERENCED
            SMF084    SMF84_SUB1_AWAIT_UNKNOWN         NOT REFERENCED
            SMF084    SMF84_SUB2_SUMM_HDR              NOT REFERENCED
            SMF084    SMF84_SUB2_SUMM_ENTRY            NOT REFERENCED
            SMF084    SMF84_SUB2_HILT_ENTRY            NOT REFERENCED
            SMF084    SMF84_SUB2_JES3_WAIT_ANALYSIS    NOT REFERENCED
            SMF084    SMF84_SUB2_PG_FLT_WAIT_ENTRY     NOT REFERENCED
            SMF084    SMF84_SUB2_SVC_WAIT_ENTRY        NOT REFERENCED
            SMF084    SMF84_SUB2_LOAD_WAIT_ENTRY       NOT REFERENCED
            SMF084    SMF84_SUB4_RESQUE_JCT_CBLK       NOT REFERENCED
            SMF084    SMF84_SUB4_JCT_ACCESS_STATS      NOT REFERENCED
            SMF084    SMF84_SUB4_CTL_BLOCK_UTIL        NOT REFERENCED
            SMF084    SMF84_SUB5_JOB_ANAL_HDR          NOT REFERENCED
            SMF084    SMF84_SUB5_WORK_TO_DO            NOT REFERENCED
            SMF084    SMF84_SUB5_JOB_ANALYSIS          NOT REFERENCED
            SMF084    SMF84_SUB5_FUNCTION_SUMM         NOT REFERENCED
            SMF084    SMF84_SUB5_PLOT_SECTION          NOT REFERENCED
            SMF084    SMF84_SUB5_PLOT_MAIN             NOT REFERENCED
            SMF084    SMF84_SUB5_PLOT_JOBCLS           NOT REFERENCED
            SMF084    SMF84_SUB5_PLOT_DEVCLS           NOT REFERENCED
            SMF084    SMF84_SUB5_PLOT_SETNAME_ONLY     NOT REFERENCED
            SMF084    SMF84_SUB5_PLOT_SETNAME_J_X_M    NOT REFERENCED
            SMF084    SMF84_SUB5_PLOT_JXM_CTR          NOT REFERENCED
            SMF084    SMF84_SUB5_PLOT_RQINDEX          NOT REFERENCED
```

Record Type 90 (5A) - System Status

Record type 90 has twenty-two (22) different formats. Each format is identified by a "subtype" value.

The master XREF (SLFALL or SLNALL) does not contain the logic required to select the proper type 90 subtype layout (there are 22 possible variations or "subtypes" of type 90 records). To handle this you may use a special XREF for mapping the type 90 record as follows:

- Offline type 90 records: **SLF090**
- Online type 90 records: **SLN090**

Be sure to use the appropriate existing supplied selection criteria member to select only type 90 records when using the SLF090 or SLN090 XREFs.

Set your "Selection criteria usage" to "E" (Existing) and specify one of the following member names in the selection criteria dataset member field:

- Select offline type 90 records: **SCF090**
- Select online type 90 records: **SCN090**

Be sure to use selection criteria to select only type 90 (X'5A') records when using the SLF090 or SLN090 XREFs.

The XREFs contain all the logic required to select the proper layout for the base section (SMF_TYPE_90_SUBTYPE_x) of each known subtype.

Figure 6-13. Type 90 Copybooks for Subtype Variations

```
File-AID ---- LIST OF AVAILABLE RECORD LAYOUTS --------------  ROW 1 TO 5 OF 5
COMMAND ===>                                                  SCROLL ===> CSR
             Member
  S    Nbr   name       01-level Name                  Status
 ---   ---  --------  -------------------------------  ------------------------
         1   SMN090    SMF_TYPE_90_SUBTYPE_1OR2       CURRENT MAP
         2   SMN090    SMF_TYPE_90_SUBTYPE_3
         3   SMN090    SMF_TYPE_90_SUBTYPE_4
         4   SMN090    SMF_TYPE_90_SUBTYPE_5OR9
         5   SMN090    SMF_TYPE_90_SUBTYPE_6OR7
         6   SMN090    SMF_TYPE_90_SUBTYPE_8
         7   SMN090    SMF_TYPE_90_SUBTYPE_10
         8   SMN090    SMF_TYPE_90_SUBTYPE_11
         9   SMN090    SMF_TYPE_90_SUBTYPE_12
        10   SMN090    SMF_TYPE_90_SUBTYPE_13
        11   SMN090    SMF_TYPE_90_SUBTYPE_14
        12   SMN090    SMF_TYPE_90_SUBTYPE_15
        13   SMN090    SMF_TYPE_90_SUBTYPE_16
        14   SMN090    SMF_TYPE_90_SUBTYPE_17
        15   SMN090    SMF_TYPE_90_SUBTYPE_18
        16   SMN090    SMF_TYPE_90_SUBTYPE_19
        17   SMN090    SMF_TYPE_90_SUBTYPE_20
        18   SMN090    SMF_TYPE_90_SUBTYPE_21
        19   SMN090    SMF_TYPE_90_SUBTYPE_22
```

Record Type 170 (AA) - File-AID Audit

An optional facility within File-AID is the activation of SMF Auditing. The File-AID/MVS installer can activate the writing of SMF records for each File-AID access to a dataset.

The File-AID installer can customize the level and quantity of information logged to SMF, and can even assign the SMF record type number to use. The default record type value 170 is distributed with File-AID. If the SMF audit facility is implemented and the SMF record mapping facility is used to view the File-AID SMF records, some tailoring may be necessary.

Record type 170 has several different formats. Each format is identified by a *subtype* value as follows:

Figure 6-14. Type 170 Copybooks for File-AID SMF Record Types

```
VALUE OF BASE FIELD
SMF17O_RRECTYPE_FA_ID   COPYBOOK NAME TO USE
======================  ======================
  X'10'                 SMF_FILEAID_ACCESS_10
  X'20'                 SMF_FILEAID_SUMMARY_20
  X'30'                 SMF_FILEAID_FIELD_UPD_30 (before/after)
  X'31'                 SMF_FILEAID_FIELD_UPD_30 (field before)
  X'32'                 SMF_FILEAID_FIELD_UPD_30 (field after
  X'41'                 SMF_FILEAID_COMP_UPD_40  (record before)
  X'42'                 SMF_FILEAID_COMP_UPD_40  (record after)
```

The master XREF (SLFALL or SLNALL) provides the logic to select the correct layout whenever a type 170 record is encountered.

If the SMF record type value chosen for File-AID SMF Audit records is NOT 170, the SLFALL and SLNALL XREFs must be updated to test for a value other than X'AA'. (See "Maintaining XREFs" on page 7-2.)

FIELD_UPD_30 and COMP_UPD_40 records contain additional sections of data. This data is the before and/or after image of the accessed dataset's fields or entire record. It may be possible to map the data record by referencing the record layout that describes the accessed dataset's record(s) in the master XREF(s).

For complex multi-file audit record mapping, a separate XREF should be built that references the SMx170 layouts for the base and the compiled data record layouts as segments.

Chapter 7.
Validating and Maintaining Your SMF Mapping Libraries

This chapter provides information on the following topics:

- Validating an SMF record layout
- Updating a layout's source
- Maintaining XREFs
- Coding your own user layouts.

Validating an SMF Record Layout

For most record types, the last field mapped should be the last data field in the record. Scrolling DOWN (PF8) to the end of the formatted display for a layout should reveal an information line like the following:

```
********************** BOTTOM OF DATA **********************
```

If the information line does not say BOTTOM OF DATA, then there is probably a difference between the release level of MVS or JES running at the time the SMF records were written, and the documentation used by Compuware to create the PL/I layout for a given record type.

If the SMF records were generated by an older system, there may be new fields defined for MVS JES V4 contained in the layout. Since these new fields don't exist in the data, the information line at the end of the data might say:

```
******* BOTTOM OF DATA - LAYOUT EXCEEDS DATA BY xx BYTES *******
```

In the case where the layout is longer than the data, there is probably no corrective action necessary. The extra layout fields are probably present to reflect future MVS JES SMF record contents.

Many SMF records contain self-defining fields that can be examined to locate differences between your current version of actual SMF data records and the Compuware-supplied SMF record PL/I layouts. These self-defining fields are called "triplets", and a triplet is present for each possible following section of fields. Each triplet consists of three binary values: a section offset, a section length, and a section count.

The value of a section offset triplet field should match the displayed offset (SHOW OFFSET, OFFSET RELATIVE) of the first layout field in the referenced section, as shown in Figure 7-2 on page 7-3. Remember, when viewing "offline" data, offsets will differ by 4. For an offline record, the triplet offset data value of a section is 4 bytes greater than the relative location of the section's fields.

Updating a Layout's Source

When a change is required to one of the supplied PL/I layouts, complete the following steps:

1. Use ISPF edit to update the PL/I library.

2. Insert new fields or comment out extra fields as needed. When removing extra fields, use the following PL/I coding syntax:

```
/*  (start comment)
*/  (end comment)
```

3. Be sure to make the same changes to both the SMFxxx (offline) and SMNxxx (online) members.
4. After your editing changes are completed, use the File-AID Format utility's, (hidden option 3.10), "C" (Compile Record Layout) option to recompile the revised PL/I source members (SMFxxx and SMNxxx) into the XREF library. See Figure 7-1. Be sure to blank out the Map Dataset "Member name" and map "Description" fields and to set the "Replace like members" switch to "Y" (yes).

Figure 7-1. 3.10 Format Utility Screen for Recompiling Layouts

```
File-AID ---------------------- FORMAT UTILITY ------------------------
OPTION  ===> C

   C     - Compile Record Layout                 B   -  Browse Map
   blank - Display member list for Map Dataset   D   -  Delete Map
                                                 P   -  Print Map


Record Layout Dataset:
   Dataset name  ===> FA.V8R8M0.SMF4.PLI
   Member name   ===> SMN030 (blank or pattern for member list)
   Volume serial ===>        (if not cataloged)
   Selection     ===> NO          (Extract record layout (Y or N))


Map Dataset:
   Dataset name  ===> FA.V8R8M0.SMF4.XREF
   Member name   ===>
   Description:  ===>
   Volume serial ===>        (if not cataloged)

   Replace like members  ===> Y  ( Y = yes; N = no)
```

Maintaining XREFs

If any XREF member changes are needed, use the XREF function, File-AID option 7, to edit existing XREF members and to create new ones.

Coding Your Own User Layouts

You may use the supplied PL/I layouts of SMF records and the examples provided by the supplied XREFs to create your own layouts and XREFs for data files such as:

- CICS journals
- DB2 logs
- IMS logs
- User SMF records.

Figure 7-2. Using Self-Defining "Triplet" to Verify Layout Accuracy

```
FILE-AID BROWSE - SYSTEM.SMF.DATA.DASDFILE ------------ UNPRINTABLE CHARACTERS
COMMAND ===>                                              SCROLL ===> CSR
RECORD:     2               SMF_TYPE_74_SUBTYPE_1            LENGTH: 5124
---- FIELD NUMBER/NAME ------ RELATIVE ----+----1----+----2----+----3----+----4
****************************** TOP OF DATA **********************************
1 SMF74FLG_SYS_IND              0:0    11001110
2 SMF74RTY_RCD_TYPE               1    74
3 SMF74TME_TM_RCD_MOVED           2    112
4 SMF74DTE_DT_RCD_MOVED           6    91220
5 SMF74SID_SYS_ID                10    9121
6 SMF74SSI_SUBSYS_ID             14    RMF
7 SMF74STY_RCD_SUBTYPE           18    1
8 SMF74TRN_NO_TRIPLETS           20    3
10 SMF74PRS_OFST_PROD_SECT       24    52  <== OFFSET TO PROD SECTION
11 SMF74PRL_LTH_PROD_SECT        28    52
12 SMF74PRN_NO_PROD_SECTS        30    1                                  (>=1)
13 SMF74DCS_OFST_CNTL_SECT       32    104 <== OFFSET TO CONTROL SECT
14 SMF74DCL_LTH_CNTL_SECT        36    24
15 SMF74DCN_NO_CNTL              38    1                                  (>=1)
16 SMF74DDS_OFST_DATA_SECT       40    128 <== OFFSET TO DATA SECTION
17 SMF74DDL_LTH_DATA_SECT        44    100
18 SMF74DDN_NO_DATA_SECTS        46    50                                 (>=1)
19 SMF74_RMF_PROD_SECTION(1)     48 <============ PROD SECTION
  20 SMF74MFV_RMF_VER_NO(1)      48    X'412F'
43 SMF74_DVC_CONTROL_DATA_SECT(1)
                                100 <============ CONTROL SECT
  44 SMF74NXT_DVC_SECTS(1)      100    0
54 SMF74_DVC_DATA_SECTION(1)    124 <============ DATA SECTION ARRAY
  55 SMF74NUM_DVC_NO(1)         124    X'0120'
  58 SMF74CNF_DVC_IND(1)      129:0
    59 SMF74QUL_0_IOS_Q(1)    129:0    0
    60 SMF74LCD_1_NO_CU(1)    129:1    1
    61 SMF74CMB_2_CMB_INV(1)  129:2    0
    62 SMF74CNF_3_RES(1)      129:3    0
    63 SMF74PAR_4_PARTIAL(1)  129:4    0
    64 SMF74MXB_5_MLT_EXP(1)  129:5    0
    65 SMF74VAC_6_DTA_INV(1)  129:6    0
    66 SMF74STA_7_DVC_ONLN(1) 129:7    1
```

Note: Offset value in triplet is different by 4 from section offset location because data is offline data.

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